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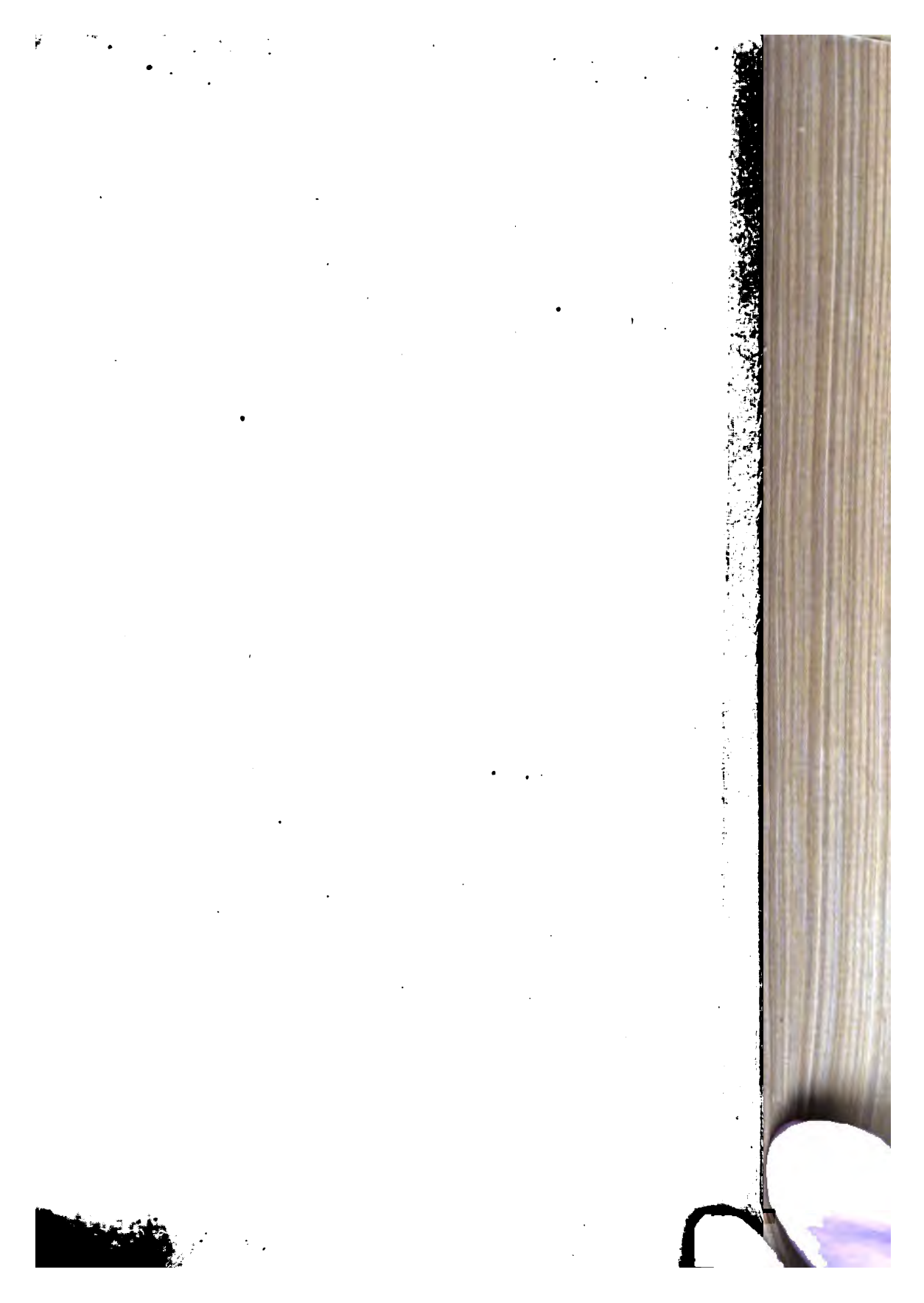

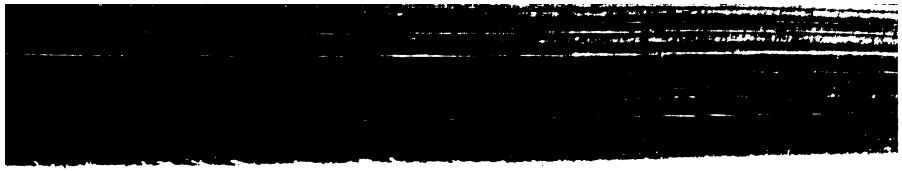

THE

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OF THE

HOUSE OF REPRESENTATIVES

FOR THE

SECOND SESSION OF THE FIFTY-FIRST CONGRESS.

1890-'91.

WITH INDEX.

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WATERTOWN ARSENAL,
Watertown, Mass., December 31, 1890.

SIR: I have the honor to submit the following report of tests of materials for industrial and other purposes made at this arsenal during the fiscal year ending June 30, 1890, in compliance with the requirements of the act of Congress appropriating funds for the testing machine.

The total number of specimens tested during the year is 5,655. The receipts and expenditures were as follows:

Amount appropriated for testing machine and testing work	$10,000.00
Received during the year for private tests	1,250.24
Total received	11,250.24
Amount expended for services and labor	8,420.33
Amount expended for light, power, tools, implements, and material for test	2,829.91
Total expended	11,250.24

The tests made are comprised under three classes, viz:

(A) Tests made for the various Departments of the Government.

(B) Tests made for private parties.

(C) Investigating tests.

A portion of the tests in Class A are tests of metals used in gun construction. Of these, 1,244 specimens have been tested during the year. The others under this class are tests made for the various arsenals and for other Departments of the Government, amounting in all to 3,420 specimens, making the total number of specimens tested under Class A during the year 4,664.

The tests made under Class B are paid for by the parties who have the tests made, and the results obtained, being confidential, are not given in the report. The total number of specimens tested in this class during the year is 991.

Class C comprises a large variety of investigating tests and work which occupies the time of the testing machine when not occupied with work comprised under Classes A and B. The object of these tests is the development of knowledge, useful to the public, in regard to the physical properties, strength, and endurance of materials used for structural purposes. The principal work and subjects of investigation pursued during the year are as follows: Tests upon the effects of alternate stresses in iron and steel; the internal strains in steel forgings; tests of railway axles and steel rails which have undergone long-continued service; the endurance of metals subjected to repeated transverse stresses in rotating shafts; an inquiry into the physical properties of natural and artificial building stones, including effects of alternate heat and cold, moisture and its absence, on their strength and endurance; and numerous special and isolated tests for developing data and knowledge in special directions, not forming an immediate part of current investigation, but giving completeness to general metallurgical knowledge and supplying valuable information to meet the exigencies of immediate demands.

Although the tests under Classes A and B were made to determine the quality of materials and whether they fulfilled specifications, many of them have furnished knowledge useful for the investigations under Class C, and some of the reports under Class A are included in the reports of these investigations.

It will be seen that certain effects of rapidly applied stresses and stresses approaching vibratory movements are conveniently investigated in this class of experiments.

It may be observed that the molecular movements, as indicated by the transverse deflection of the shafts, is not interfered with by the highest speed of rotation which has yet been employed if the stresses are below the elastic limit of the metal.

If, however, the elastic limit is exceeded, the transverse deflection is less at high speeds than at low speeds. There is not time enough for performing the work against molecular friction and for completing the bending movement. In this case there is a rapid elevation in temperature unless means are employed to prevent it, such as running a stream of cold water on the shaft.

Comparative tests of both iron and steel shafts have been made at ordinary atmospheric temperature, and the same at the temperature of a blue heat or in the vicinity of 500° to 700° F.

Attention is invited to the remarkable endurance of a cast-iron bar which has made 37,151,900 revolutions while under the maximum fiber stress of 15,000 pounds per square inch. The bar is still unbroken.

A portion of the shafts have been annealed at intervals. Others have been run at higher temperatures for a time and the test then completed cold. Some bars have been initially heated by means of gas burners and the tests commenced hot and so continued. Others have been allowed to acquire a higher temperature from the molecular friction caused by excessive loads and a high rate of speed, no external heat being supplied in this case.

It is proposed to extend the tests by embracing a wider range of material in which the physical properties of the metals vary, from differences in chemical composition, and from differences in manipulation in the process of manufacture, comprising both hot worked and cold rolled, swaged, or drawn material. It is proposed also to continue the investigation at different temperatures; to ascertain the effect of overstraining with high loads on the subsequent endurance under moderate stresses to ascertain whether time is a function of the ultimate endurance, *i. e.*, whether varying the speed of rotation, other conditions of stresses; and temperature remaining unchanged, affects the results. It is also proposed, for observations upon the elastic properties, to increase the speed to the highest attainable.

ALTERNATE STRAINING OF STEEL, WROUGHT IRON, AND CAST IRON BARS.

This series of tests has been undertaken chiefly for the investigation of the elastic properties of steel and iron; the disturbance of elastic limits by overstraining; the temporary changes in the modulus of elasticity; the observance of bars which have rested a long time after they have been overstrained by tensile stresses or compressing stresses, and the restorative effects of annealing at different temperatures and by exposure to the annealing temperature through varying periods of time. Incidental to the above observations have also been made upon the ratio of lateral contraction to longitudinal extension and of lateral expansion to longitudinal compression.

These tests have been inaugurated and valuable data have been developed, yet much of the work contemplated on this series remains to be done.

In conjunction with the alternate straining by tension and compression stresses, there are in progress similar tests by transverse stresses, not included in the rotating tests.

series of tests upon the strength of steel rails. The series will embrace the tests of a large number of different types of rails and of metal having a wide range of chemical composition. A number of old rails which have given excellent results against abrasion and wear in the track will be examined by different physical tests and chemical analyses. Transverse elasticity and strength are now undergoing examination, and more extended results on this subject will appear in the next annual report of tests.

Some important results are now being reached with rails examined after they have been repeatedly so overloaded as to cause bending in different directions—that is, first downward and then upward—which treatment, in conjunction with the test of corresponding steels at higher temperatures, affords an intimate knowledge of the effects of overloading the track, of how far efforts to correct bent rails in the track may be successful, and determine what is the final state of the metal after such efforts. Also, the tests directly demonstrate what state new rails may be expected to be in which have been straightened by the usual process of *gagging* at low temperatures. All the phenomena connected with overstraining rails is of exceeding interest and will be fully developed in the next report.

TESTS OF NATURAL AND ARTIFICIAL STONES.

Some artificial stones and the natural stones of geological classes generally in use for building purposes are being investigated. The results in this report comprise coefficients of expansion and moduli of elasticity under compression stresses. These are preliminary to an exhaustive physical and chemical investigation of this class of material which is now in progress. This includes an investigation of the elastic properties of stones under pressure; the observation of phenomena under the application of heat and frost, wetting and drying; chemical composition; and the effects of solvents and oxidizing elements and compounds. It is hoped that an exhaustive investigation of both well-known durable stones and of well-known bad stones which fail and decay in known ways may determine enough of the characteristics of good and bad stones to enable us to ascertain thereafter by simple economical tests whether stones are suitable for architectural and engineering structures (or at least aid us in so doing). At present the only practicable sure method is the tedious and expensive test of erecting structures and waiting several decades to observe the effects of time, atmospheric and weather influences, and involves the serious expense of having structures fail because stones that were believed to be good turn out to be bad, or the expense of declining to use good cheap stones because they could not be proven to be good.

The increasing tendency to erect high architectural structures in large cities and the increasing magnitude of engineering structures adds greatly to the importance of the investigation of the elastic properties of building stones and brick. This subject has received too little attention hitherto, and will be a prominent feature in the prosecution of this investigation.

During the current year the investigation of the strength and elasticity of hemp and manilla cordage, commenced some years ago, will be continued on ropes of larger sizes.

The temperature tests of iron and steel will also be resumed.

It is thought that the data already developed places this subject in advance of all previous experiments. The intimate relation existing between the solution of important metallurgical manufacturing ques-

No. 3866.

Marks, $\frac{32\ R\ 5\ T}{B\ T\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000400	.000300	.....	.....	
4,000	20,000	.000650	.000250	.....	.....	
6,000	30,000	.000950	.000300	.....	.....	
7,000	35,000	.001100	.000250	0.	.....	
8,000	40,000	.001250	.000150	.....	.....	
8,400	42,000	.001300	.000050	0.	.....	
8,600	43,000	.001350	.000050	.....	.....	
8,800	44,000	.001400	.000050	.....	.....	
9,000	45,000	.001450	.000050	.....	.....	
9,200	46,000	.001500	.000050	.....	.....	
9,400	47,000	.001550	.000050	.....	.....	
9,600	48,000	.001600	.000050	.....	.....	
9,800	49,000	.001700	.000100	.....	.....	Elastic limit.
10,000	50,000	.002200	.000500	.....	.....	
10,200	51,000	.004150	.001950	.....	.....	
10,400	52,000	.005600	.001450	.....	.....	
10,800	54,000	.007800	.002200	.....	.....	
11,200	56,000	.010000	.002200	.....	.....	
11,600	58,000	.011900	.001900	.....	.....	
12,000	60,000	.014250	.002350	.....	.....	
12,400	62,000	.016350	.002100	.....	.....	
17,260	86,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,800
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".30", ".12

No. 3931.

Marks, $\frac{32\ R_{ss}\ T}{B\ T_1\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001200	.000200	.000050	.000050	
8,000	40,000	.001350	.000150	.....	.....	
8,400	42,000	.001450	.000100	.000050	0.	
8,600	43,000	.001500	.000050	.....	.....	
8,800	44,000	.001500	0.	.....	.....	
9,000	45,000	.001550	.000050	.....	.....	
9,200	46,000	.001600	.000050	.....	.....	
9,400	47,000	.001650	.000050	.....	.....	Elastic limit.
9,600	48,000	.001800	.000150	.....	.....	
9,800	49,000	.001950	.000150	.....	.....	
10,000	50,000	.002250	.000300	.....	.....	
10,400	52,000	.004250	.002000	.....	.....	
10,800	54,000	.007000	.002750	.....	.....	
11,200	56,000	.007900	.000900	.....	.....	
11,600	58,000	.009850	.001950	.....	.....	
12,000	60,000	.012300	.002450	.....	.....	
18,120	90,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,600
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	0.2000
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per centum of original section		30.7
Position of rupture		".75 from neck
Character of broken surface		granular, 60 per cent.; silky, serrated, 40 per cent.

No. 3939.

Marks, $\frac{33\ R_2T}{B\ T_2M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	----	
2,000	10,000	.000300	.000150	----	----	
4,000	20,000	.000600	.000300	----	----	
6,000	30,000	.000900	.000300	----	----	
7,000	35,000	.001050	.000150	0.	----	
8,000	40,000	.001300	.000250	----	----	
8,400	42,000	.001550	.000250	.000150	.000150	Elastic limit.
8,600	43,000	.002600	.001050	----	----	
8,800	44,000	.005400	.002800	----	----	
9,000	45,000	.006200	.000800	----	----	
9,400	47,000	.008400	.002200	----	----	
9,800	49,000	.010400	.002000	----	----	
10,200	51,000	.012600	.002200	----	----	
10,600	53,000	.014900	.002300	----	----	
11,000	55,000	.017000	.002100	----	----	
16,210	81,050	----	----	----	----	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,050
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		1".15 from neck
Character of broken surface		silky
Elongation of inch sections		".27", ".23

No. 3941.

Marks, $\frac{32\ B_{34}\ T}{B\ T_{2}\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000350	.000200	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001100	.000150	0.	.....	
8,000	40,000	.002550	.001450	.001350	.001350	Elastic limit below 40,000 pounds per square inch.
8,200	41,000	.004900	.002350	.....	.....	
8,400	42,000	.008050	.003150	.....	.....	
8,600	43,000	.009000	.000950	.....	.....	
8,800	44,000	.010050	.001050	.....	.....	
9,200	46,000	.012350	.002300	.....	.....	
9,600	48,000	.014750	.002400	.....	.....	
10,000	50,000	.017000	.002250	.....	.....	
10,400	52,000	.019400	.002400	.....	.....	
10,800	54,000	.022350	.002950	.....	.....	
15,420	77,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,100
Elongation per inch after rupture	inch..	0.2500
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		46.3
Position of rupture		1″.10 from neck
Character of broken surface		silky
Elongation of inch sections		″.20, ″.30

No. 3884.

Marks, $\frac{32\ R_{ss}\ T}{B\ T,\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
280	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000400	.000250	.....	.....	
4,000	20,000	.000750	.000350	.....	.....	
6,000	30,000	.001200	.000450	.....	.....	
7,000	35,000	.001350	.000150	.000100	.000100	
8,000	40,000	.001500	.000150	.....	.....	
8,400	42,000	.001550	.000050	.000100	.0	
8,600	43,000	.001600	.000050	.....	.....	
8,800	44,000	.001650	.000050	.....	.....	
9,000	45,000	.001700	.000050	.....	.....	Elastic limit.
9,200	46,000	.004900	.003200	.....	.....	
9,400	47,000	.006600	.001700	.....	.....	
9,600	48,000	.008000	.001400	.....	.....	
10,000	50,000	.010350	.002350	.....	.....	
10,400	52,000	.012250	.001900	.....	.....	
10,800	54,000	.014500	.002250	.....	.....	
11,200	56,000	.017250	.002750	.....	.....	
11,600	58,000	.020000	.002750	.....	.....	
16,110	80,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,550
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do....	.001700
Reduction in diameter at point of rupture	do....	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		1" from neck
Character of broken surface		silky, oblique, serrated
Elongation of inch sections		".15 ".33*

No. 3885.

Marks, $\frac{32\ B\ T}{B\ T}\ \frac{R\ S\ T}{M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	----	
2,000	10,000	.000300	.000150	----	----	
4,000	20,000	.000600	.000300	----	----	
6,000	30,000	.000900	.000300	----	----	
7,000	35,000	.001100	.000300	0.	----	
8,000	40,000	.001200	.000100	----	----	
8,400	42,000	.001300	.000100	0.	----	
8,600	43,000	.001300	0.	----	----	
8,800	44,000	.001350	.000050	----	----	
9,000	45,000	.001350	0.	----	----	Elastic limit.
9,200	46,000	.007450	.006100	----	----	
9,400	47,000	.007850	.000400	----	----	
9,600	48,000	.008650	.000800	----	----	
10,000	50,000	.011000	.002350	----	----	
10,400	52,000	.013250	.002250	----	----	
10,800	54,000	.015350	.002100	----	----	
11,200	56,000	.017550	.002200	----	----	
11,600	58,000	.020000	.002450	----	----	
16,210	81,050	----	----	----	----	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,050
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	0.2350
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		″.65 from neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.33*, ″.14

No. 3942.

Marks, $\frac{22\,B_{14}\,T}{M\,T,\,M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000900	.000350	0.	.....	
7,000	35,000	.001000	.000200	.....	.....	
8,000	40,000	.001300	.000200	.....	.....	
8,400	42,000	.001350	.000050	0.	.....	
8,600	43,000	.001400	.000050	.....	.....	
8,800	44,000	.001400	0.	.....	.....	
9,000	45,000	.001450	.000050	.....	.....	
9,200	46,000	.001500	.000050	.....	.....	
9,400	47,000	.001500	0.	.....	.....	
9,600	48,000	.001550	.000050	.....	.....	
9,800	49,000	.001600	.000050	.....	.....	Elastic limit.
10,000	50,000	.001850	.000250	.....	.....	
10,200	51,000	.002450	.000600	.....	.....	
10,400	52,000	.003750	.001300	.....	.....	
10,800	54,000	.007000	.003250	.....	.....	
11,200	56,000	.008750	.001750	.....	.....	
11,600	58,000	.011500	.002750	.....	.....	
12,000	60,000	.014000	.002500	.....	.....	
12,400	62,000	.016250	.002250	.....	.....	
17,580	87,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,900
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	0.2000
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		".60 from neck
Character of broken surface		silky
Elongation of inch sections		".09, ".31*

No. 3943.

Marks, $\frac{32\ R_{M}\ T}{M\ T\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, ″2.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remar
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
7,000	35,000	.001150	.000200	0.	.....	
8,000	40,000	.001300	.000150	.....	.....	
8,400	42,000	.001350	.000050	0.	.....	
8,600	43,000	.001350	0.	.....	.....	
8,800	44,000	.001400	.000050	.....	.....	
9,000	45,000	.001450	.000050	.....	.....	Elastic limit.
9,200	46,000	.002000	.000550	.....	.....	
9,400	47,000	.002700	.000700	.....	.....	
9,600	48,000	.003750	.001050	.....	.....	
10,000	50,000	.006900	.003150	.....	.....	
10,400	52,000	.009000	.002100	.....	.....	
10,800	54,000	.011400	.002400	.....	.....	
11,200	56,000	.012900	.001500	.....	.....	
17,340	86,700	.....	.....	.....	.....	Tensile streng

General summary.

Tensile strength per square inch of original section.....pou
Elastic limit per square inch of original section .....
Elongation per inch after rupture i
Elongation per inch under strain at elastic limit.....
Reduction in diameter at point of rupture.....
Reduction in area after rupture, per centum of original section .....
Position of rupture .....″1.
Character of broken surface.....
Elongation of inch sections.....

No. 3886.

Marks, $\frac{32}{M}\ \frac{B_{25}\ T}{T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000200	.000200	0.		
2,000	10,000	.000500	.000300			
4,000	20,000	.000850	.000350			
6,000	30,000	.001150	.000300			
7,000	35,000	.001350	.000200	.000050	.000050	
8,000	40,000	.001450	.000100			
8,400	42,000	.001500	.000050	.000100	.000050	
8,600	43,000	.001550	.000050			
8,800	44,000	.001550	0.			
9,000	45,000	.001600	.000050			
9,200	46,000	.001600	0.			
9,400	47,000	.001650	.000050			
9,600	48,000	.001700	.000050			
9,800	49,000	.001700	0.			
10,000	50,000	.001750	.000050			
10,200	51,000	.001800	.000050			
10,400	52,000	.001900	.000100			Elastic limit.
10,600	53,000	.002150	.000250			
10,800	54,000	.003200	.001050			
11,000	55,000	.005900	.002700			
11,400	57,000	.010000	.004100			
11,800	59,000	.012350	.002350			
12,200	61,000	.014750	.002400			
12,600	63,000	.017150	.002400			
13,000	65,000	.019900	.002750			
17,300	86,500					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,500
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	0.2600
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		1″.15 from neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.24, ″.28*

No. 3822.

Marks, $\frac{82\,R_{W}\,T}{M\,T_{1}\,M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001100	.000150	0.	.....	
8,000	40,000	.001350	.000250	.....	.....	
8,400	42,000	.001400	.000050	0.	.....	
8,600	43,000	.001450	.000050	.....	.....	
8,800	44,000	.001500	.000050	.....	.....	Elastic limit.
9,000	45,000	.003250	.001750	.....	.....	
9,200	46,000	.005250	.002000	.....	.....	
9,400	47,000	.006750	.001550	.....	.....	
9,800	49,000	.008200	.001450	.....	.....	
10,200	51,000	.010350	.002150	.....	.....	
10,600	53,000	.012500	.002150	.....	.....	
11,000	55,000	.014500	.002000	.....	.....	
11,400	57,000	.016750	.002250	.....	.....	
16,620	83,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,100
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	0.235
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		1″ from neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.18, ″.27

No. 3823.

Marks, $\frac{32 \text{ R} \sim \text{T}}{\text{M T} \cdot \text{M}}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
300	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000450	.000300	.....	.....	
4,000	20,000	.000850	.000400	.....	.....	
6,000	30,000	.001050	.000200	.....	.....	
7,000	35,000	.001300	.000250	0.	.....	
8,000	40,000	.001400	.000100	....	.....	
8,400	42,000	.001450	.000050	.000050	.000050	
8,600	43,000	.001500	.000050	.....	.....	
8,800	44,000	.001500	0.	.....	.....	
9,000	45,000	.001550	.000050	.....	.....	
9,200	46,000	.001600	.000050	.....	.....	Elastic limit.
9,400	47,000	.002750	.001150	.....	.....	
9,600	48,000	.003750	.001000	.....	.....	
9,800	49,000	.004750	.001000	.....	.....	
10,200	51,000	.007250	.002500	.....	.....	
10,600	53,000	.009000	.001750	.....	.....	
11,000	55,000	.011750	.002750	.....	.....	
11,400	57,000	.014000	.002250	.....	.....	
11,800	59,000	.015600	.001600	.....	.....	
17,130	85,650	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,650
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do...	.0016
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		1", 28 from neck
Character of broken surface		silky, serrated
Elongation of inch sections		"28", ".22"

No. 3935.

Marks, $\frac{22\ R_{on}\ T}{B\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001200	.000250	0.	.....	
8,000	40,000	.001350	.000150	.....	.....	
8,400	42,000	.001400	.000050	.000050	.000050	
8,600	43,000	.001450	.000050	.....	.....	Elastic limit.
8,800	44,000	.001950	.000500	.....	.....	
9,000	45,000	.005000	.003050	.....	.....	
9,200	46,000	.005850	.000850	.....	.....	
9,600	48,000	.008000	.002150	.....	.....	
10,000	50,000	.010000	.002000	.....	.....	
10,400	52,000	.012250	.002250	.....	.....	
10,800	54,000	.014400	.002150	.....	.....	
11,200	56,000	.016650	.002250	.....	.....	
16,500	82,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,500
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	0.1900
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".23, ".15

No. 3936.

Marks, $\frac{32 R_{\infty} T}{B T_4 M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000600	.000300	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001300	.000150	.....	.....	
8,400	42,000	.001400	.000100	0.	.....	Elastic limit.
8,600	43,000	.002400	.001000	.....	.....	
8,800	44,000	.002900	.000500	.....	.....	
9,000	45,000	.003500	.000600	.....	.....	
9,400	47,000	.005250	.002750	.....	.....	
9,800	49,000	.007900	.001650	.....	.....	
10,200	51,000	.010050	.002150	.....	.....	
10,600	53,000	.012050	.002000	.....	.....	
11,000	55,000	.013900	.001850	.....	.....	
17,200	86,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,000
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		".60 from neck
Character of broken surface		silky
Elongation of inch sections		".33*, ".15

No. 3849.

Marks, $\frac{32\ R_{36}\ T}{B\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000300	.000250	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.001000	.000450	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001450	.000300	.....	.....	
8,400	42,000	.001500	.000050	.000050	.000050	
8,600	43,000	.001500	0.	.....	.....	
8,800	44,000	.001550	.000050	.....	.....	
9,000	45,000	.001600	.000050	.....	.....	Elastic limit.
9,200	46,000	.001800	.000200	.....	.....	
9,400	47,000	.002500	.000700	.....	.....	
9,600	48,000	.004250	.001750	.....	.....	
10,000	50,000	.005500	.001250	.....	.....	
10,400	52,000	.008500	.003000	.....	.....	
10,800	54,000	.011500	.003000	.....	.....	
11,200	56,000	.013250	.001750	.....	.....	
11,600	58,000	.016000	.002750	.....	.....	
17,210	86,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,050
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2250
Elongation per inch under strain at elastic limit	do....	.001600
Reduction in diameter at point of rupture	do....	.125
Reduction in area after rupture, per centum of original section		46.3
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".33

No. 3850.

Marks, $\frac{32\ R_{ed}\ T}{B\ T_4\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.000900	.000300	.....	.....	
7,000	35,000	.001100	.000200	0.	.....	
8,000	40,000	.001300	.000200	.....	.....	
8,400	42,000	.001400	.000100	0.	.....	
8,600	43,000	.001400	0.	.....	.....	
8,800	44,000	.001450	.000050	.....	.....	
9,000	45,000	.001500	.000050	.....	.....	Elastic limit.
9,200	46,000	.004600	.003100	.....	.....	
9,400	47,000	.006400	.001800	.....	.....	
9,600	48,000	.007600	.001200	.....	.....	
10,000	50,000	.009500	.001900	.....	.....	
10,400	52,000	.012000	.002500	.....	.....	
10,800	54,000	.013500	.001500	.....	.....	
11,200	56,000	.016550	.003050	.....	.....	
11,600	58,000	.018750	.002200	.....	.....	
16,460	82,300	.....	.....	.....	.....	Tensile strength.

General summary.

mate strength per square inch of original section	pounds..	82,300
astic limit per square inch of original section	do...	45,000
ongation per inch after rupture	inch..	0.2450
ongation per inch under strain at elastic limit	do...	.001500
duction in diameter at point of rupture	do...	.135
duction in area after rupture, per centum of original section		46.2
sition of rupture		at middle of stem
aracter of broken surface		silky
agation of inch sections		″.25*, ″.24*

No. 3851.

Marks, $\frac{82\ R_{ss}\ T}{M\ T_2\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000600	.000350	.....	.....	
6,000	30,000	.000950	.000350	.....	.....	
7,000	35,000	.001150	.000200	0.	.....	
8,000	40,000	.001350	.000200	.....	.....	
8,400	42,000	.001400	.000050	0.	.....	
8,600	43,000	.001450	.000050	.....	.....	
8,800	44,000	.001550	.000100	.....	.....	
9,000	45,000	.001600	.000050	.....	.....	
9,200	46,000	.001600	0.	.....	.....	
9,400	47,000	.001650	.000050	.....	.....	
9,600	48,000	.001650	0.	.....	.....	
9,800	49,000	.001700	.000050	.....	.....	
10,000	50,000	.001700	0.	.....	.....	Elastic limit.
10,200	51,000	.002050	.000350	.....	.....	
10,400	52,000	.004750	.002700	.....	.....	
10,600	53,000	.005600	.000850	.....	.....	
11,000	55,000	.008100	.002500	.....	.....	
11,400	57,000	.009750	.001650	.....	.....	
11,800	59,000	.011500	.001750	.....	.....	
12,200	61,000	.013750	.002250	.....	.....	
12,600	63,000	.015500	.001750	.....	.....	
18,310	91,550	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,550
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	0.2100
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture		.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		".65 from neck
Character of broken surface		silky
Elongation of inch sections		".12, ".30

No. 3852.

Marks, $\frac{32\ R_{..}\ T}{M\ T,\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 600	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.		
2, 000	10, 000	.000250	.000150			
4, 000	20, 000	.000550	.000300			
6, 000	30, 000	.000900	.000350			
7, 000	35, 000	.001100	.000200	0.		
8, 000	40, 000	.001300	.000200			
8, 400	42, 000	.001350	.000050	0.		
8, 600	43, 000	.001400	.000050			
8, 800	44, 000	.001450	.000050			
9, 000	45, 000	.001500	.000050			
9, 200	46, 000	.001500	0.			
9, 400	47, 000	.001550	.000050			
9, 600	48, 000	.001550	0.			
9, 800	49, 000	.001600	.000050			
10, 000	50, 000	.001600	0.			Elastic limit.
10, 200	51, 000	.001850	.000250			
10, 400	52, 000	.004000	.002150			
10, 600	53, 000	.005500	.001500			
11, 000	55, 000	.007600	.002100			
11, 400	57, 000	.009600	.002000			
11, 800	59, 000	.011750	.002150			
12, 200	61, 000	.013000	.001250			
12, 800	63, 000	.015000	.002000			
18, 110	90, 550					Tensile strength.

General summary.

Rifle strength per square inch of original section	pounds..	90, 550
Elastic limit per square inch of original section	do...	50, 000
Elongation per inch after rupture	inch..	0. 2200
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46. 2
Position of rupture		".80 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".33*

No. 3932.

Marks, $\frac{32\ R_{es}\ T}{B\ T_r\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000300	.000200			
4,000	20,000	.000700	.000400			
6,000	30,000	.001050	.000350			
7,000	35,000	.001200	.000150	0.		
8,000	40,000	.001450	.000250			
8,400	42,000	.001500	.000050	.000100	.000100	
8,600	43,000	.001550	.000050			
8,800	44,000	.001600	.000050			
9,000	45,000	.001600	0.			
9,200	46,000	.001650	.000050			
9,400	47,000	.001700	.000050			
9,600	48,000	.001750	.000050			
9,800	49,000	.001750	0.			
10,000	50,000	.001850	.000100			Elastic limit.
10,200	51,000	.002050	.000200			
10,400	52,000	.003200	.001150			
10,600	53,000	.005000	.001800			
11,000	55,000	.007350	.002350			
11,400	57,000	.009850	.002500			
11,800	59,000	.011750	.001900			
12,200	61,000	.013900	.002150			
12,600	63,000	.015850	.001950			
17,980	89,900					Tensile strengt

General summary.

Tensile strength per square inch of original section ..... pound
Elastic limit per square inch of original section ..... do
Elongation per inch after rupture ..... incl
Elongation per inch under strain at elastic limit ..... do
Reduction in diameter at point of rupture ..... do
Reduction in area after rupture, per centum of original section .....
Position of rupture ..... ″.6
Character of broken surface .....
Elongation of inch sections .....

No. 3815.

Marks, $\frac{32 R_{34} T}{T_1 M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	.....	
2,000	10,000	.000250	.000200	.....	.....	
4,000	20,000	.000350	.000400	.....	.....	
6,000	30,000	.001000	.000350	.....	.....	
8,000	40,000	.001350	.000350	0.	.....	
9,200	46,000	.001550	.000200	.000050	.000050	
9,400	47,000	.001550	0.	.....	.....	
9,600	48,000	.001600	.000050	.....	.....	
9,800	49,000	.001650	.000050	.....	.....	
10,000	50,000	.001750	.000100	.....	.....	Elastic limit.
10,200	51,000	.001950	.000200	.....	.....	
10,400	52,000	.002600	.000650	.....	.....	
10,600	53,000	.003700	.001100	.....	.....	
11,000	55,000	.005900	.002200	.....	.....	
11,400	57,000	.007650	.001750	.....	.....	
11,800	59,000	.009900	.002250	.....	.....	
12,200	61,000	.011550	.001650	.....	.....	
12,600	63,000	.013400	.001850	.....	.....	
18,820	94,600	.....	.....	.....	.....	Tensile strength.

General summary.

tile strength per square inch of original section	pounds..	94,600
stic limit per square inch of original section	do...	50,000
gation per inch after rupture	inch..	0.2500
gation per inch under strain at elastic limit	do...	.001750
action in diameter at point of rupture	do...	.135
action in area after rupture, per centum of original section		46.2
tion of rupture		".90 from neck
acter of broken surface		silky, trace of granulation
ation of inch sections		".34*, ".16

No. 3940.

Marks, $\frac{32\ R_{\infty}\ T}{B\ T_{1}\ M}$
Diameter, $''.505$.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000450	.000300	.....	.....	
4,000	20,000	.000950	.000500	.....	.....	
6,000	30,000	.001300	.000350	.....	.....	
7,000	35,000	.001500	.000200	0.	.....	
8,000	40,000	.001650	.000150	0.	.....	
8,400	42,000	.001700	.000050	.....	.....	
8,600	43,000	.001700	0.	.....	.....	
8,800	44,000	.001800	.000100	.....	.....	Elastic limit.
9,000	45,000	.002050	.000250	.....	.....	
9,200	46,000	.004050	.002000	.....	.....	
9,400	47,000	.005550	.001500	.....	.....	
9,800	49,000	.008000	.002450	.....	.....	
10,200	51,000	.011050	.003050	.....	.....	
10,600	53,000	.012250	.001200	.....	.....	
11,000	55,000	.014550	.002300	.....	.....	
11,400	57,000	.016900	.002350	.....	.....	
16,690	83,450	.....	.....	.....	.....	Tensile strength

General summary.

Tensile strength per square inch of original section ..... pounds
Elastic limit per square inch of original section ..... do.
Elongation per inch after rupture ..... inch
Elongation per inch under strain at elastic limit ..... do.
Reduction in diameter at point of rupture ..... do.
Reduction in area after rupture, per centum of original section .....
Position of rupture ..... 1″
Character of broken surface .....
Elongation of inch sections .....

No. 3934.

Marks, $\frac{\text{B R}}{\text{B T}}$, $\frac{\text{T}}{\text{M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000650	.000400	.....	.....	
6,000	30,000	.001050	.000400	.....	.....	
7,000	35,000	.001250	.000200	0.	.....	
8,000	40,000	.001350	.000100	.....	.....	
8,400	42,000	.001400	.000050	0.	.....	
8,600	43,000	.001450	.000050	.....	.....	
8,800	44,000	.001450	0.	.....	.....	
9,000	45,000	.001500	.000050	.....	.....	
9,200	46,000	.001560	0.	.....	.....	
9,400	47,000	.001550	.000050	.....	.....	Elastic limit.
9,600	48,000	.001700	.000150	.....	.....	
9,800	49,000	.002600	.001100	.....	.....	
10,000	50,000	.004250	.001650	.....	.....	
10,400	52,000	.006350	.002100	.....	.....	
10,800	54,000	.008100	.001750	.....	.....	
11,200	56,000	.009900	.001800	.....	.....	
11,600	58,000	.011750	.001850	.....	.....	
12,000	60,000	.013100	.001350	.....	.....	
18,010	90,050	.....	.....	.....	.....	Tensile strength.

General summary.

...ile strength per square inch of original section	pounds..	90,050
...tic limit per square inch of original section	do...	47,000
...gation per inch after rupture	inch..	0.2000
...gation per inch under strain at elastic limit	do...	.001550
...ction in diameter at point of rupture	do...	.115
...ction in area after rupture, per centum of original section		40.3
...on of rupture		1″.00 from neck
...cter of broken surface		silky
...tion of inch sections		″.27*, ″.13

No. 3970.

Marks, $\frac{82\ R_{70}\ T}{B\ T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
4,000	20,000	.000550	.000250	.....	.....	
6,000	30,000	.001000	.000450	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001400	.000250	.....	.....	
8,400	42,000	.001450	.000050	0.	.....	Elastic limit.
8,600	43,000	.002500	.001050	.....	.....	
8,800	44,000	.003200	.000700	.....	.....	
9,000	45,000	.005500	.002300	.....	.....	
9,400	47,000	.007400	.001900	.....	.....	
9,800	49,000	.009500	.002100	.....	.....	
10,200	51,000	.011500	.002000	.....	.....	
10,600	53,000	.013500	.002000	.....	.....	
11,000	55,000	.015350	.001850	.....	.....	
16,830	84,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,150
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.2150
Elongation per inch under strain at elastic limit	do....	.001450
Reduction of diameter at point of rupture	do....	.105
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		″.60 from neck
Character of broken surface		silky, serrated; granular in part at the circumference
Elongation of inch sections		″.12, ″.21

No. 3971.

Marks, $\frac{32\ R_P\ T}{B\ T_4\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.000900	.000300	.....	.....	
7,000	35,000	.001050	.000150	0.	.....	
8,000	40,000	.001250	.000200	.....	.....	
8,400	42,000	.001400	.000150	0.	.....	Elastic limit.
8,600	43,000	.001600	.000200	.....	.....	
8,800	44,000	.003500	.001900	.....	.....	
9,000	45,000	.004250	.000750	.....	.....	
9,400	47,000	.006500	.002250	.....	.....	
9,800	49,000	.008250	.001750	.....	.....	
10,200	51,000	.010250	.002000	.....	.....	
10,600	53,000	.012500	.002250	.....	.....	
11,000	55,000	.014350	.001850	.....	.....	
16,810	84,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,050
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.1950
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		″.60 from neck
Character of broken surface		silky; serrated; granular in part at circumference
Elongation of inch sections		″.27*, ″.12

No. 3972.

Marks, $\frac{32\ R_{70}\ T}{M\ T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
4,000	20,000	.000600	.000250	.....	.....	
6,000	30,000	.001000	.000400	.....	.....	
7,000	35,000	.001150	.000150	0.	.....	
8,000	40,000	.001400	.000250	.....	.....	
8,400	42,000	.001450	.000050	.....	.....	
8,600	43,000	.001500	.000050	.....	.....	Elastic limit.
8,800	44,000	.002400	.000900	.....	.....	
9,000	45,000	.005350	.002950	.....	.....	
9,200	46,000	.007250	.001900	.....	.....	
9,600	48,000	.009600	.002350	.....	.....	
10,000	50,000	.011900	.002300	.....	.....	
10,400	52,000	.014000	.002100	.....	.....	
10,800	54,000	.016400	.002400	.....	.....	
11,200	56,000	.019000	.002600	.....	.....	
16,190	80,950	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,950
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	0.2400
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		40.3
Position of rupture		1″.10 from neck
Character of broken surface		silky; serrated
Elongation of inch sections		″.15, ″.30*

No. 3973.

Marks, $\frac{22\ R_{..}\ T}{M\ T,\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000400	.000300			
4,000	20,000	.000650	.000250			
6,000	30,000	.001000	.000350			
7,000	35,000	.001200	.000200	.000050	.000050	
8,000	40,000	.001400	.000200			
8,400	42,000	.001450	.000050	.000150	.000100	Elastic limit.
8,600	43,000	.005850	.004400			
8,800	44,000	.007100	.001250			
9,000	45,000	.008000	.000900			
9,400	47,000	.010250	.002250			
9,800	49,000	.012500	.002250			
10,200	51,000	.014850	.002350			
10,600	53,000	.017400	.002560			
11,000	55,000	.020250	.002850			
16,020	80,100					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,100
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	0.2450
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".33", ".16

No. 3933.

Marks, $\frac{32\ R_1\ T}{B\ T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, ″2.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
4,000	20,000	.000550	.000300	.....	.....	
6,000	30,000	.000950	.000400	.....	.....	
7,000	35,000	.001100	.000150	.000050	.000050	
8,000	40,000	.001250	.000150	.....	.....	
8,400	42,000	.001350	.000100	.000050	0.	
8,600	43,000	.001400	.000050	.....	.....	
8,800	44,000	.001400	0.	.....	.....	
9,000	45,000	.001450	.000050	.....	.....	
9,200	46,000	.001500	.000050	.....	.....	
9,400	47,000	.001500	0.	.....	.....	Elastic limit.
9,600	48,000	.002250	.000750	.....	.....	
9,800	49,000	.002900	.000650	.....	.....	
10,000	50,000	.004900	.002000	.....	.....	
10,400	52,000	.007400	.002500	.....	.....	
10,800	54,000	.009500	.002100	.....	.....	
11,200	56,000	.011750	.002250	.....	.....	
11,600	58,000	.013600	.001850	.....	.....	
12,000	60,000	.015500	.001900	.....	.....	
17,370	86,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,850
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	0.2000
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per centum of original section		30.7
Position of rupture		″.60 from neck
Character of broken surface, granular, radiating from a dull spot in the circumference; opened cracks in surface of stem.		
Elongation of inch sections		″.28* ″.12

No. 3845.

Marks, $\frac{22\ R_2\ T}{B\ T_1\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000300	.000200			
4,000	20,000	.000550	.000250			
6,000	30,000	.001000	.000450			
7,000	35,000	.001150	.000150	0.		
8,000	40,000	.001300	.000150			
8,400	42,000	.001350	.000050	.000050	.000050	
8,600	43,000	.001400	.000050			
8,800	44,000	.001450	.000050			
9,000	45,000	.001500	.000050			Elastic limit.
9,200	46,000	.002250	.000750			
9,400	47,000	.003400	.001150			
9,600	48,000	.005000	.001600			
10,000	50,000	.007150	.002150			
10,400	52,000	.009250	.002100			
10,800	54,000	.011350	.002100			
11,200	56,000	.013350	.002000			
11,600	58,000	.015600	.002250			
16,980	84,900					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,900
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	0.2500
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per centum of original section		51.9
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".37*, ".13

No. 3825.

Marks, $\frac{32\ R\ G\ C}{T_1\ M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,600	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000400	.000250	.....	.....	
6,000	30,000	.001000	.000600	.....	.....	
10,000	50,000	.001650	.000650	.....	.....	
12,000	60,000	.002050	.000400	.000050	.000050	
14,000	70,000	.002400	.000350	.....	.....	
14,200	71,000	.002500	.000100	.....	.....	
14,400	72,000	.002600	.000100	.....	.....	
14,600	73,000	.002700	.000100	.....	.....	Elastic limit.
14,800	74,000	.002900	.000200	.....	.....	
15,000	75,000	.003050	.000150	.....	.....	
15,200	76,000	.003350	.000300	.....	.....	
15,600	78,000	.004000	.000650	.....	.....	
16,000	80,000	.004750	.000750	.....	.....	
16,400	82,000	.005850	.001100	.....	.....	
16,800	84,000	.006850	.001000	.....	.....	
17,200	86,000	.008250	.001400	.....	.....	
26,170	130,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	130,850
Elastic limit per square inch of original section	do...	73,000
Elongation per inch after rupture	inch..	0.1450
Elongation per inch under strain at elastic limit	do...	.002750
Reduction in diameter at point of rupture	do...	.695
Reduction in area after rupture, per centum of original section		30.7
Position of rupture		1".10 from neck.
Character of broken surface		granular, 557 per cent.; silky, 45 per cent
Elongation of inch sections		".18, ".11

No. 3937.

Marks, $\overset{22\ R\ G\ C}{T,M}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000350	.000250			
6,000	30,000	.001100	.000750			
10,000	50,000	.001750	.000650			
12,000	60,000	.002100	.000350	0.		
14,000	70,000	.002450	.000350	.000050	.000050	
14,200	71,000	.002550	.000100			
14,400	72,000	.002600	.000050			
14,600	73,000	.002650	.000050			
14,800	74,000	.002750	.000100			Elastic limit.
15,000	75,000	.002900	.000150			
15,200	76,000	.003100	.000200			
15,400	77,000	.003400	.000300			
15,800	79,000	.004050	.000650			
16,200	81,000	.004950	.000900			
16,600	83,000	.006050	.001100			
17,000	85,000	.007400	.001350			
17,400	87,000	.008450	.001050			
26,420	132,100					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	132,100
Elastic limit per square inch of original section	do...	74,000
Elongation per inch after rupture	inch..	0.1400
Elongation per inch under strain at elastic limit	do...	.002750
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per centum of original section		30.7
Position of rupture		".80 from neck
Character of broken surface		granular; silky center
Elongation of inch sections		".20", ".08

No. 3938.

Marks, $\frac{32\ R\ G\ C}{T_2\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
6,000	30,000	.000900	.000600	.....	.....	
10,000	50,000	.001600	.000700	.....	.....	
12,000	60,000	.001950	.000350	0.	.....	
14,000	70,000	.002300	.000350	0.	.....	
14,200	71,000	.002350	.000050	.....	.....	
14,400	72,000	.002400	.000050	.....	.....	
14,600	73,000	.002400	0.	.....	.....	
14,800	74,000	.002450	.000050	.....	.....	
15,000	75,000	.002500	.000050	.....	.....	
15,200	76,000	.002550	.000050	.....	.....	
15,400	77,000	.002550	0.	.....	.....	
15,600	78,000	.002600	.000050	.....	.....	Elastic limit.
15,800	79,000	.002800	.000200	.....	.....	
16,000	80,000	.003000	.000200	.....	.....	
16,200	81,000	.003250	.000250	.....	.....	
16,600	83,000	.003800	.000550	.....	.....	
17,000	85,000	.005050	.001250	.....	.....	
17,400	87,000	.006500	.001450	.....	.....	
17,800	89,000	.007750	.001250	.....	.....	
18,200	91,000	.008900	.001150	.....	.....	
26,770	133,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,850
Elastic limit per square inch of original section	do...	78,000
Elongation per inch after rupture	inch..	0″.1450
Elongation per inch under strain at elastic limit	do...	″.002600
Reduction in diameter at point of rupture	do...	″.085
Reduction in area after rupture, per centum of original section		30.7
Position of rupture		″.75 from neck
Character of broken surface		granular; silky spot at circumference
Elongation of inch sections		″.23°, ″.07

No. 3819.

Marks, $^{33}\,R\,{}^{13}_{T,M}\,G\,C$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
6,000	30,000	.000950	.000700	.....	.....	
10,000	50,000	.001650	.000700	.....	.....	
12,000	60,000	.001950	.000300	0.	.....	
14,000	70,000	.002400	.000450	0.	.....	
14,200	71,000	.002450	.000050	.....	.....	
14,400	72,000	.002500	.000050	.....	.....	
14,600	73,000	.002600	.000100	.....	.....	
14,800	74,000	.002650	.000050	.....	.....	Elastic limit.
15,000	75,000	.002900	.000250	.....	.....	
15,200	76,000	.003050	.000150	.....	.....	
15,400	77,000	.003500	.000450	.....	.....	
15,800	79,000	.004500	.001000	.....	.....	
16,200	81,000	.005700	.001200	.....	.....	
16,600	83,000	.007500	.001800	.....	.....	
17,000	85,000	.008850	.001350	.....	.....	
17,400	87,000	.009950	.001100	.....	.....	
25,860	129,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	129,300
Elastic limit per square inch of original section	do...	74,000
Elongation per inch after rupture	inch..	0.1450
Elongation per inch under strain at elastic limit	do...	.002650
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per centum of original section		34.0
Position of rupture		″.80 from neck
Character of broken surface		silky, 40 per cent.; granular, 60 per cent.
Elongation of inch sections		″.09, ″.20*

No. 3870.

Marks, $\frac{32\ R.\ G\ C}{T.\ M}$
Diameter, $''.505$.
Sectional area, .20 square inch.
Gauged length, $2''$.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.		
2,000	10,000	.000300	.000250			
6,000	30,000	.000950	.000650			
10,000	50,000	.001600	.000650			
12,000	60,000	.001950	.000350	0.		
14,000	70,000	.002350	.000400	0.		
14,200	71,000	.002400	.000050			
14,400	72,000	.002450	.000050			
14,600	73,000	.002550	.000050			
14,800	74,000	.002550	.000050			
15,000	75,000	.002550	0.			
15,200	76,000	.002700	.000150			
15,400	77,000	.002800	.000100			
15,600	78,000	.002850	.000050			
15,800	79,000	.002950	.000100			
16,000	80,000	.003050	.000100			Elastic limit.
16,200	81,000	.003250	.000200			
16,400	82,000	.003450	.000200			
16,600	83,000	.003700	.000250			
17,000	85,000	.004100	.000400			
17,400	87,000	.005100	.001000			
17,800	89,000	.006100	.001000			
18,200	91,000	.007100	.001000			
18,600	93,000	.008250	.001150			
27,980	139,900					Tensile strength.

General summary.

Tensile strength per square inch of original section.....pounds.
Elastic limit per square inch of original section.....do....
Elongation per inch after rupture.....inch.
Elongation per inch under strain at elastic limit.....do..
Reduction in diameter at point of rupture.....do..
Reduction in area after rupture, per centum of original section.....
Position of rupture.....".40 f
Character of broken surface.....granular; dull spot at circu
Elongation of inch sections.....

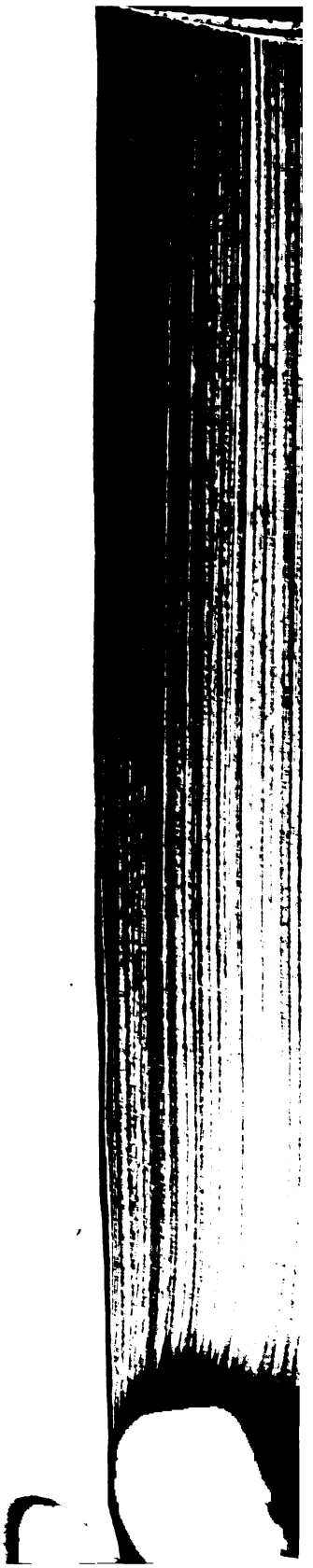
No. 3878.

rks, $\frac{H P_m G C}{T_s M}$
meter, ".505.
ional area, .20 square inch.
ed length, 2".

d loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	Inch.	Inch.	Inch.	Inch.	
1, 000	0.	0.	0.	0.	Initial load.
5, 000	.000100	.000100	0.	.....	
10, 000	.000300	.000200	.....	.....	
30, 000	.001050	.000750	.....	.....	
50, 000	.001700	.000650	.....	.....	
60, 000	.002050	.000350	.000050	.000050	
70, 000	.002400	.000350	.000050	0.	
71, 000	.002450	.000050	.....	.....	
72, 000	.002500	.000050	.....	.....	
74, 000	.002550	.000050	.....	.....	
75, 000	.002600	.000050	.....	.....	
76, 000	.002700	.000100	.....	.....	
77, 000	.002800	.000100	.....	.....	Elastic limit.
78, 000	.003000	.000200	.....	.....	
79, 000	.003250	.000250	.....	.....	
80, 000	.003550	.000300	.....	.....	
82, 000	.004300	.000750	.....	.....	
84, 000	.005200	.000900	.....	.....	
86, 000	.006300	.001100	.....	.....	
88, 000	.007350	.001050	.....	.....	
90, 000	.008650	.001300	.....	.....	
96, 400	.....	.....	.....	.....	Tensile strength.

General summary.

per square inch of original section	pounds..	136, 400
square inch of original section	do...	77, 000
nch after rupture	inch..	0.1400
nch under strain at elastic limit	do...	.002800
meter at point of rupture	do...	.065
n after rupture, per centum of original section		22. 9
ure		".75 from neck
ken surface		granular; dull eccentric spo*
eh sections		".08, ".206



No. 3820.

Marks, $\frac{32\ R_2\ G\ O}{T_1\ M}$
Diameter, ″.505.
Sectional area, 20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000350	.000250	.....	.....	
6,000	30,000	.001050	.000700	.....	.....	
10,000	50,000	.001750	.000700	.....	.....	
12,000	60,000	.002100	.000350	0.	.....	
14,000	70,000	.002950	.000850	.000500	.000500	Elastic limit (approximate).
14,200	71,000	.003250	.000300	.....	.....	
14,400	72,000	.003500	.000250	.....	.....	
14,600	73,000	.003750	.000250	.....	.....	
15,000	75,000	.004600	.000850	.....	.....	
15,400	77,000	.005650	.001050	.....	.....	
15,800	79,000	.006750	.001100	.....	.....	
16,200	81,000	.007700	.000950	.....	.....	
16,600	83,000	.009000	.001300	.....	.....	
25,810	129,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	129,050
Elastic limit per square inch of original section (approximate)	do...	70,000
Elongation per inch after rupture	inch..	0.1450
Elongation per inch under strain at elastic limit	do...	.002950
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per centum of original section		27.4
Position of rupture		″.95 from neck
Character of broken surface		granular; silky center
Elongation of inch sections		″.10, ″.19

3.2-INCH STEEL B. L. RIFLES.

SPECIFIC GRAVITY AND HARDNESS OF TUBES AND JACKETS.

Number of rifle.	Marks on specimen.	Specific gravity.	Hardness.
51	32 R_{51} T B R_3 M	7.8539	17.26
56	32 R_{51} T B R_5 M	7.8555	16.90
66	32 R_{66} T B R_3 M	7.8508	18.58
68	32 R_{68} T B R_3 M	7.8544	16.82
75	31 R_{75} T B R_3 M	7.8540	15.36
51	32 R_{51} J R_3 M	7.8516	19.29
56	32 R_{56} J R_3 M	7.8470	16.81
61	32 R_{61} J R_3 M	7.8465	17.81
68	32 R_{68} J R_3 M	7.8457	17.81
71	32 R_{71} J R_3 M	7.8524	18.98

TABULATION OF SPECIMENS FROM 3.2-INCH B. L. STEEL RIFLES.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.
			Pounds.	*Pounds.*	*Per ct.*	*Per ct.*	
3888	Tube No. 54	Middle	49,000	86,800	21.0	46.2	Silky.
3881	Tube No. 55	do	47,000	90,600	20.0	30.7	Granular, 60 per cent.; silky serrated, 40 per cent.
3839	Tube No. 56	do	42,000	81,050	25.0	43.3	Silky.
3841	do	do	*40,000	77,100	25.0	40.3	Do.
3884	do	do	45,000	80,550	24.0	40.3	Silky serrated.
3885	do	do	45,000	81,050	23.5	40.3	Do.
3842	do	do	49,000	87,900	20.0	43.3	Do.
3843	do	do	45,000	86,700	24.0	43.3	Do.
3886	do	do	52,000	86,500	26.0	43.3	Do.
3822	Tube No. 57	do	44,000	83,100	22.5	37.1	Do.
3823	do	do	46,000	85,650	25.0	43.3	Do.
3835	Tube No. 60	do	43,000	82,500	19.0	37.1	Do.
3836	do	do	42,000	86,000	24.0	40.3	Do.
3849	Tube No. 64	do	45,000	86,050	22.5	43.3	Do.
3850	do	do	45,000	82,300	24.5	46.2	Do.
3851	do	do	50,000	91,550	21.0	40.3	Do.
3852	do	do	50,000	90,550	22.0	46.2	Do.
3832	Tube No. 66	do	50,000	89,900	23.0	43.3	Do.
3815	do	do	50,000	94,600	25.0	46.2	Silky, trace of granulation.
3840	Tube No. 68	do	44,000	83,450	25.0	43.3	Do.
3834	Tube No. 69	do	47,000	90,050	20.0	40.3	Do.
3870	Tube No. 70	do	42,000	84,150	21.5	37.1	Silky serrated and granular.
3871	do	do	42,000	84,050	19.5	37.1	Do.
3872	do	do	43,000	80,950	24.0	40.3	Silky serrated.
3873	do	do	42,000	80,100	24.5	43.3	Do.
3833	Tube No. 71	do	47,000	86,850	20.0	30.7	Granulation radiating from dull spot.
3845	Tube No. 73	do	45,000	84,900	25.0	51.9	Silky.
3825	Gas check	do	73,000	130,850	14.5	30.7	Granular, 55 per cent.; silky, 45 per cent.
3837	do	do	74,000	132,100	14.0	30.7	Granular, silky center.
3838	do	do	78,000	133,850	14.5	30.7	Granular, silky spot.
3819	Gas check No. 12.	do	74,000	129,300	14.0	34.0	Silky, 40 per cent.; granular, 60 per cent.
3870	Gas check No. 51.	do	80,000	139,900	18.5	20.5	Granular, with dull spot.
3878	do	do	77,000	136,400	14.0	23.9	Do.
3820	Gas check No. 70.	do	70,000	129,050	14.5	27.4	Granular, silky center.

* Below.

3.6-INCH B. L. RIFLE.

SPECIMENS FROM KEY RING.

No. 3818.

Marks, $\frac{3.6\ R_1\ K\ R}{T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
7,500	30,000	.000900	.000600	.....	.....	
10,000	50,000	.001700	.000800	.....	.....	
12,100	60,000	.005750	.004050	.003500	.003500	
12,200	61,000	.006500	.000750	.....	.....	
12,400	62,000	.007400	.000900	.....	.....	
12,600	63,000	.008400	.001000	.....	.....	
12,800	64,000	.009200	.000800	.....	.....	
13,200	66,000	.010900	.001700	.....	.....	
13,600	68,000	.012300	.001400	.....	.....	
14,000	70,000	.014300	.002000	.....	.....	
14,400	72,000	.015850	.001550	.....	.....	
20,620	103,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,100
Elongation per inch after rupture	inch..	0.235
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per centum of original section		43.3
Position of rupture		″.85 from neck
Character of broken surface		fine, silky
Elongation of inch sections		″.15, ″.32

8-INCH STEEL B. L. RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

No. 891.

Marks, $\frac{8\,R.\,T}{B\,T.\,I}$
Length, 5″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1, 000	0.	0.	0.	0.	Initial load.
4, 000	5, 000	.000100	.000100	.....	.....	
8, 000	10, 000	.000267	.000167	.....	.....	
12, 000	15, 000	.000400	.000133	.....	.....	
16, 000	20, 000	.000567	.000167	0.	.....	
20, 000	25, 000	.000767	.000200	.....	.....	
24, 000	30, 000	.000900	.000133	.....	.....	
28, 000	35, 000	.001100	.000200	.....	.....	
31, 200	39, 000	.001267	.000167	.....	.....	Elastic limit.
32, 000	40, 000	.002600	.001333	.001367	.001367	
32, 800	41, 000	.004400	.00 800	.....	.....	
33, 600	42, 000	.005000	.000600	.....	.....	
34, 400	43, 000	.005967	.000967	.....	.....	
35, 200	44, 000	.006600	.000633	.....	.....	
36, 800	46, 000	.008233	.001633	.....	.....	
38, 400	48, 000	.009933	.001700	.....	.....	
40, 000	50, 000	.011833	.001900	.....	.....	Ultimate strength.
68, 780	85, 975	.....	.....	.....	.....	

Failed by triple flexure.

No. 889.

Marks, $\frac{8\ R_2\ J}{B\ T_1\ O}$
Length, 5″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.000067	.000067	.....	.....	
8,000	10,000	.000233	.000166	.....	.....	
12,000	15,000	.000367	.000134	.....	.....	
16,000	20,000	.000500	.000133	0.	.....	
20,000	25,000	.000667	.000167	.....	.....	
24,000	30,000	.000833	.000166	.....	.....	
28,000	35,000	.001000	.000167	.....	.....	
32,000	40,000	.001100	.000100	0.	.....	
36,000	45,000	.001267	.000167	.....	.....	
40,000	50,000	.001500	.000233	.....	.....	
44,000	55,000	.001667	.000167	.....	.....	Elastic limit.
44,800	56,000	.001933	.000266	.....	.....	
45,600	57,000	.002667	.000734	.....	.....	
46,400	58,000	.003167	.000500	.....	.....	
47,200	59,000	.003833	.000666	.....	.....	
48,000	60,000	.004800	.000967	.....	.....	
49,600	62,000	.006167	.001367	.....	.....	
51,200	64,000	.007667	.001500	.....	.....	
52,800	66,000	.008967	.001300	.....	.....	
54,400	68,000	.010400	.001433	.....	.....	
56,000	70,000	.011833	.001433	.....	.....	
86,460	108,075	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 888.

Marks, $\frac{8\ R.\ T.}{B\ T.\ M.}$
Length, 5″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.000133	.000133			
8,000	10,000	.000267	.000134			
12,000	15,000	.000400	.000133			
16,000	20,000	.000567	.000167	.000033	.000033	
20,000	25,000	.000733	.000166			
24,000	30,000	.000900	.000167			
28,000	35,000	.001067	.000167			
32,000	40,000	.001233	.000166	.000067	.000034	
36,000	45,000	.001367	.000134			
36,800	46,000	.001433	.000066			Elastic limit.
37,600	47,000	.001600	.000167			
38,400	48,000	.003767	.002167			
39,200	49,000	.004600	.000833			
40,000	50,000	.005100	.000500			
41,600	52,000	.006433	.001333			
43,200	54,000	.008000	.001567			
44,800	56,000	.009400	.001400			
46,400	58,000	.011033	.001633			
48,000	60,000	.015167	.004134			
76,250	95,310					Ultimate strength.

Failed by triple **flexure.**

No. 892.

Marks, $\frac{8\ R_4\ J}{B\ T_8 M}$
Length 5″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 3″.

Applied loads		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.000100	.000100	.....	.....	
8,000	10,000	.000233	.000133	.....	.....	
12,000	15,000	.000400	.000167	.....	.....	
16,000	20,000	.000533	.000133	0.	.....	
20,000	25,000	.000667	.000134	.....	.....	
24,000	30,000	.000833	.000166	.....	.....	
28,000	35,000	.001000	.000167	.....	.....	
32,000	40,000	.001167	.000167	0.	.....	
36,000	45,000	.001333	.000166	.....	.....	
40,000	50,000	.001500	.000167	.....	.....	
40,800	51,000	.001600	.000100	.....	.....	
41,600	52,000	.001667	.000067	.....	.....	Elastic limit.
42,400	53,000	.001833	.000166	.....	.....	
43,200	54,000	.002100	.000267	.....	.....	
44,000	55,000	.002567	.000467	.....	.....	
44,800	56,000	.002967	.000400	.....	.....	
46,400	58,000	.004233	.001266	.....	.....	
48,000	60,000	.006000	.001767	.....	.....	
84,600	105,750	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4259.

Marks, $\frac{8\ R.\ J}{MT.\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged, length 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000600	.000300	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
10,000	40,000	.001267	.000334	0.	.....	
11,000	44,000	.001433	.000166	0.	.....	
11,250	45,000	.001433	0.	.....	.....	
11,500	46,000	.001467	.000034	.....	.....	
11,750	47,000	.001500	.000033	.....	.....	
12,000	48,000	.001567	.000067	.....	.....	
12,250	49,000	.001600	.000033	.....	.....	
12,500	50,000	.001633	.000033	.....	.....	
12,750	51,000	.001667	.000034	.....	.....	
13,000	52,000	.001700	.000033	.....	.....	
13,250	53,000	.001733	.000033	.....	.....	Elastic limit.
13,500	54,000	.008700	.006967	.....	.....	
13,750	55,000	.009267	.000567	.....	.....	
14,000	56,000	.009933	.000666	.....	.....	
14,500	58,000	.011600	.001667	.....	.....	
15,000	60,000	.013233	.001633	.....	.....	
15,500	62,010	.015000	.001767	.....	.....	
16,000	64,000	.017233	.002233	.....	.....	
16,500	66,000	.019000	.001767	.....	.....	
23,670	94,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,680
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″ 60 from neck
Character of broken surface		silky
Elongation of inch sections		″.19, ″.84,* ″.10

No. 4260.

Marks, $\frac{8\ R_1\ J}{B\ T_2\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000633	.000383	.....	.....	
7,500	30,000	.000967	.000334	.....	.....	
10,000	40,000	.001333	.000366	0.	.....	
11,000	44,000	.001467	.000134	0.	.....	
11,250	45,000	.001500	.000033	.....	.....	
11,500	46,000	.001567	.000067	.....	.....	
11,750	47,000	.001600	.000033	.....	.....	
12,000	48,000	.001633	.000033	.....	.....	
12,250	49,000	.001667	.000034	.....	.....	
12,500	50,000	.001700	.000033	.....	.....	
12,750	51,000	.001733	.001566	.....	.....	Elastic limit.
13,000	52,000	.008700	.006967	.....	.....	
13,250	53,000	.009367	.000667	.....	.....	
13,500	54,000	.010167	.000800	.....	.....	
14,000	56,000	.011733	.001566	.....	.....	
14,500	58,000	.013500	.001767	.....	.....	
15,000	60,000	.015167	.001667	.....	.....	
15,500	62,000	.017133	.001966	.....	.....	
16,000	64,000	.019167	.002034	.....	.....	
23,210	92,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,840
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″.45 from neck
Character of broken surface		silky
Elongation of inch sections		″.13, ″30, * ″.17

No. 890.

Marks, $\frac{8\ R_2\ J}{B\ T_2\ M}$
Length, 5″.
Diameter, 1″.0092.
Sectional area, .80 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
800	1,000	0.	0.	0.	0.	Initial load.
4,000	5,000	.000067	.000067	.....	.....	
8,000	10,000	.000233	.000166	.....	.....	
12,000	15,000	.000367	.000134	.....	.....	
16,000	20,000	.000533	.000166	0.	.....	
20,000	25,000	.000700	.000167	.....	.....	
24,000	30,000	.000867	.000167	.....	.....	
28,000	35,000	.001033	.000166	.....	.....	
32,000	40,000	.001167	.000134	.000033	.000033	
36,000	45,000	.001333	.000166	.....	.....	
40,000	50,000	.001533	.000200	.....	.....	
40,800	51,000	.001600	.000067	.....	.....	Elastic limit.
41,600	52,000	.005333	.003733	.....	.....	
42,400	53,000	.006100	.000767	.....	.....	
43,200	54,000	.006767	.000667	.....	.....	
44,000	55,000	.007267	.000500	.....	.....	
44,800	56,000	.008067	.000800	.....	.....	
46,400	58,000	.009267	.001200	.....	.....	
48,000	60,000	.010767	.001500	.....	.....	
82,280	102,825	.....	.....	.....	.....	Ultimate strength.

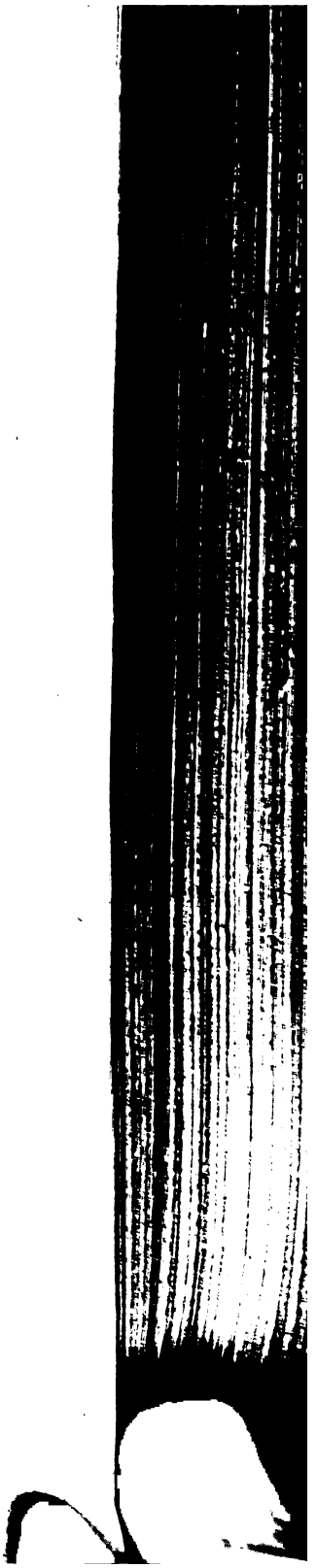
Failed by triple flexure.

HARDNESS AND SPECIFIC GRAVITY.

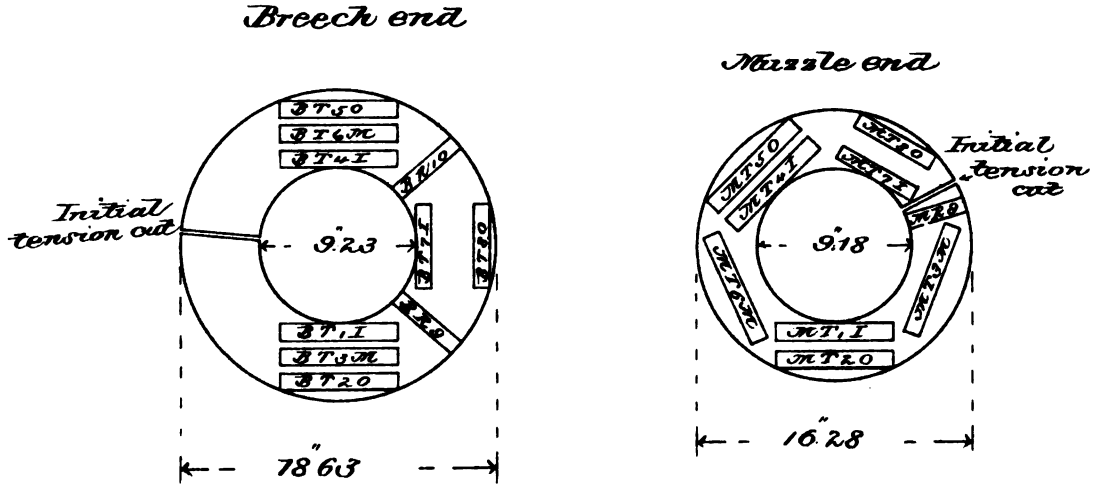
Marks.	Hardness.	Specific gravity.
8 R_2 A_4 M R_{10} M.....	21.64	7.8573
8 R_2 T B R_8 M.....	15.20	7.8639
8 R_2 J B R_{10} M.....	20.03	7.8572
8 R_3 A_4 M R_1 M.....	20.47	7.8536
8 R_4 T B R_8 M.....	18.38	7.8598
8 R_4 J B R_8 M.....	20.70	7.8560
8 R_4 D_1 R_4 M.....	22.64	7.8496
8 R_5 A_4 M R_4 M.....	21.40	7.8494
8 R_6 J B_4 R M.....	17.99	7.8625

10-INCH WIRE-WOUND RIFLE.

SPECIMENS FROM TUBE, JACKET, AND HOOPS.



70-inch Wire Wound Rifle Tube



No. 3958.

Marks, $^{10\ W\ R\ T}_{B\ T,\ I}$
Diameter, *".564.*
Sectional area, *.25* **square inch.**
Gauged length, *4".*

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	0.		
2,500	10,000	.000225	.000175			
5,000	20,000	.000675	.000450			
7,500	30,000	.001025	.000350			
8,750	35,000	.001225	.000200	.000050	.000050	
9,000	36,000	.001250	.000025			
9,250	37,000	.001275	.000050			
9,500	38,000	.001300	.000025			Elastic limit.
9,750	39,000	.001425	.000125			
10,000	40,000	.001525	.000100	.000175	.000125	
10,250	41,000	.001650	.000125			
10,500	42,000	.002200	.000550			
10,750	43,000	.002875	.000675			
11,000	44,000	.003525	.000650			
11,500	46,000	.004675	.001150			
12,000	48,000	.006250	.001575			
12,500	50,000	.008175	.001925			
13,000	52,000	.010000	.001825			
13,500	54,000	.012000	.002000			
14,000	56,000	.014250	.002250			
14,500	58,000	.016375	.002125			
15,000	60,000	.018700	.002325			
15,500	62,000	.021125	.002425			
16,000	64,000	.023900	.002775			
16,500	66,000	.027000	.003100			
17,000	68,000	.030250	.003250			
17,500	70,000	.033450	.003200			
18,000	72,000	.038000	.004550			
18,500	74,000	.0425	.0045			
19,000	76,000	.0475	.0050			
19,500	78,000	.0538	.0063			
20,000	80,000	.0650	.0112			
20,500	82,000	.0750	.0100			
21,000	84,000	.0925	.0175			
21,420	85,680					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,680
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch.	.2050
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".14, ".20, ".35*

No. 3959.

Marks, $\frac{10\ WRT}{BT,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	.....	.....	
2,500	10,000	.000275	.000150	.....	.....	
5,000	20,000	.000675	.000400	.....	.....	
7,500	30,000	.001000	.000325	.....	.....	
8,750	35,000	.001225	.000225	0.	.....	
9,000	36,000	.001250	.000025	.....	.....	
9,250	37,000	.001275	.000025	.....	.....	
9,500	38,000	.001325	.000050	.....	.....	
9,750	39,000	.001375	.000050	.....	.....	
10,000	40,000	.001425	.000050	0.	.....	
10,250	41,000	.001450	.000025	.....	.....	
10,500	42,000	.001475	.000025	.....	.....	
10,750	43,000	.001500	.000025	.....	.....	
11,000	44,000	.001550	.000050	.....	.....	
11,250	45,000	.001575	.000025	.....	.....	
11,500	46,000	.001650	.000075	.....	.....	
11,750	47,000	.001700	.000050	.....	.....	
12,000	48,000	.001775	.000075	.....	.....	Elastic limit.
12,250	49,000	.004500	.002725	.....	.....	
12,500	50,000	.007000	.002500	.....	.....	
12,750	51,000	.007450	.000450	.....	.....	
13,000	52,000	.008375	.000925	.....	.....	
13,500	54,000	.010000	.001625	.....	.....	
14,000	56,000	.011875	.001875	.....	.....	
14,500	58,000	.013875	.002000	.....	.....	
15,000	60,000	.015925	.002050	.....	.....	
15,500	62,000	.018000	.002075	.....	.....	
16,000	64,000	.020425	.002425	.....	.....	
16,500	66,000	.023000	.002575	.....	.....	
17,000	68,000	.025500	.002500	.....	.....	
17,500	70,000	.028500	.003000	.....	.....	
18,000	72,000	.031625	.003125	.....	.....	
18,500	74,000	.035000	.003375	.....	.....	
19,000	76,000	.039000	.004000	.....	.....	
19,500	78,000	.043500	.004500	.....	.....	
20,000	80,000	.049125	.005625	.....	.....	
20,500	82,000	.053750	.004625	.....	.....	
21,000	84,000	.0650	.011250	.....	.....	
21,500	86,000	.0750	.0100	.....	.....	
22,000	88,000	.0950	.0200	.....	.....	
22,460	89,840	.1475	.0525	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,840
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001775
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		1". 85 from neck
Character of broken surface		silky
Elongation of inch sections		".13, ."41," ".17, ".13

No. 3969.

Marks, $\frac{10\ W\ R\ T}{B\ T,\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125			
2,500	10,000	.000300	.000175			
5,000	20,000	.000675	.000375			
7,500	30,000	.001000	.000325			
8,750	35,000	.001200	.000200	0.		
9,000	36,000	.001250	.000050			
9,250	37,000	.001275	.000025			
9,500	38,000	.001300	.000025			Elastic limit.
9,750	39,000	.001425	.000125			
10,000	40,000	.001550	.000125	.000275	.000275	
10,250	41,000	.002675	.001125			
10,500	42,000	.003500	.000825			
10,750	43,000	.004325	.000825			
11,000	44,000	.005175	.000850			
11,250	45,000	.006925	.000750			
11,500	46,000	.006950	.001025			
12,000	48,000	.008675	.001725			
12,500	50,000	.011000	.002325			
13,000	52,000	.013125	.002125			
13,500	54,000	.015500	.002375			
14,000	56,000	.017500	.002000			
14,500	58,000	.020000	.002500			
15,000	60,000	.022750	.002750			
15,500	62,000	.025750	.003000			
16,000	64,000	.028700	.002950			
16,500	66,000	.032500	.003800			
17,000	68,000	.036500	.004000			
17,500	70,000	.041250	.004750			
18,000	72,000	.046875	.005625			
18,500	74,000	.053250	.006375			
19,000	76,000	.0650	.011750			
19,500	78,000	.0750	.0100			
20,000	80,000	.0925	.0175			
20,500	82,000	.1325	.0400			
20,510	82,040	.1550	.0225			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,040
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.2225
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		2".40 from neck
Character of broken surface		silky
Elongation of inch sections		".14, ".33, ".30, ".12

No. 3961.

Marks, $\frac{10\ W\ R\ T}{B\ T_4\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000275	.000150	.....	.....	
5,000	20,000	.000675	.000400	.....	.....	
7,000	30,000	.001025	.000350	.....	.....	
8,750	35,000	.001250	.000225	.000025	.000025	
9,000	36,000	.001275	.000025	.....	.....	
9,250	37,000	.001300	.000025	.....	.....	Elastic limit.
9,500	38,000	.001425	.000125	.....	.....	
9,750	39,000	.001500	.000075	.....	.....	
10,000	40,000	.001700	.000200	.000350	.000325	
10,250	41,000	.001900	.000200	.....	.....	
10,500	42,000	.002250	.000350	.....	.....	
10,750	43,000	.002800	.000550	.....	.....	
11,000	44,000	.003625	.000825	.....	.....	
11,250	45,000	.004100	.000475	.....	.....	
11,500	46,000	.004750	.000650	.....	.....	
12,000	48,000	.006625	.001875	.....	.....	
12,500	50,000	.008500	.001875	.....	.....	
13,000	52,000	.010625	.002125	.....	.....	
13,500	54,000	.012500	.001875	.....	.....	
14,000	56,000	.014500	.002000	.....	.....	
14,500	58,000	.016700	.002200	.....	.....	
15,000	60,000	.019200	.002500	.....	.....	
15,500	62,000	.021750	.002550	.....	.....	
16,000	64,000	.024625	.002875	.....	.....	
16,500	66,000	.027750	.003125	.....	.....	
17,000	68,000	.031250	.003500	.....	.....	
17,500	70,000	.035000	.003750	.....	.....	
18,000	72,000	.039125	.004125	.....	.....	
18,500	74,000	.043750	.004625	.....	.....	
19,000	76,000	.0500	.006250	.....	.....	
19,500	78,000	.0575	.0075	.....	.....	
20,000	80,000	.0675	.0100	.....	.....	
20,500	82,000	.0800	.0125	.....	.....	
21,000	84,000	.1050	.0250	.....	.....	
21,160	84,640	.1500	.0540	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84,640
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.1925
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		".50 from neck
Character of broken surface		silky
Elongation of inch sections		".37*, ".15, ".13, ".12

No. 3913.

Marks, $\frac{10\,W\,R\,T}{B\,T_e\,M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, ".4

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	0.	.....	
2,500	10,000	.000350	.000175	.....	.....	
5,000	20,000	.000675	.000325	.....	.....	
7,500	30,000	.001100	.000425	.....	.....	
8,750	35,000	.001250	.000150	.000050	.000050	
9,000	36,000	.001300	.000050	.....	.....	
9,250	37,000	.001350	.000050	.....	.....	Elastic limit.
9,500	38,000	.001425	.000075	.....	.....	
9,750	39,000	.001650	.000225	.....	.....	
10,000	40,000	.002075	.000425	.000775	.000725	
10,250	41,000	.002750	.000675	.....	.....	
10,500	42,000	.003800	.001050	.....	.....	
10,750	43,000	.004750	.000950	.....	.....	
11,000	44,000	.005700	.000950	.....	.....	
11,250	45,000	.006500	.000800	.....	.....	
11,500	46,000	.007400	.000900	.....	.....	
12,000	48,000	.009250	.001850	.....	.....	
12,500	50,000	.011625	.002375	.....	.....	
13,000	52,000	.013500	.001875	.....	.....	
13,500	54,000	.015700	.002200	.....	.....	
14,000	56,000	.017925	.002225	.....	.....	
14,500	58,000	.020650	.002725	.....	.....	
15,000	60,000	.023500	.002850	.....	.....	
15,500	62,000	.026575	.003075	.....	.....	
16,000	64,000	.029950	.003375	.....	.....	
16,500	66,000	.033500	.003550	.....	.....	
17,000	68,000	.037925	.004425	.....	.....	
17,500	70,000	.042625	.004700	.....	.....	
18,000	72,000	.048250	.005625	.....	.....	
18,500	74,000	.0550	.006750	.....	.....	
19,000	76,000	.0675	.0125	.....	.....	
19,500	78,000	.0750	.0075	.....	.....	
20,000	80,000	.0975	.0225	.....	.....	
20,480	81,920	.1550	.0575	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,920
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch...	.2100
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		48.7
Position of rupture		"1 from neck
Character of broken surface		silky
Elongation of inch sections		".13, ".14, ".20, ".37

No. 3965.

Marks, $\frac{10\ W\ R\ T}{M\ T,\ O}$
Diameter $7/8$".564.
Sectional area, .25 square inch.
Gauged length 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000350	.000200	.....	.....	
5,000	20,000	.000725	.000375	.....	.....	
7,500	30,000	.001025	.000300	.....	.....	
8,750	35,000	.001225	.000200	0.	.....	
10,000	40,000	.000375	.000150	0.	.....	
10,250	41,000	.001400	.000025	.....	.....	
10,500	42,000	.001425	.000025	.....	.....	
10,750	43,000	.001475	.000050	.....	.....	
11,000	44,000	.001525	.000050	.....	.....	
11,250	45,000	.001550	.000025	.....	.....	
11,500	46,000	.001575	.000025	.....	.....	Elastic limit.
11,750	47,000	.001675	.000100	.....	.....	
12,000	48,000	.004250	.002575	.....	.....	
12,250	49,000	.005500	.001250	.....	.....	
12,500	50,000	.006750	.001250	.....	.....	
13,000	52,000	.008275	.001525	.....	.....	
13,500	54,000	.010125	.001850	.....	.....	
14,000	56,000	.011950	.001825	.....	.....	
14,500	58,000	.013775	.001825	.....	.....	
15,000	60,000	.015950	.002175	.....	.....	
15,500	62,000	.018250	.002300	.....	.....	
16,000	64,000	.020300	.002050	.....	.....	
16,500	66,000	.022875	.002575	.....	.....	
17,000	68,000	.025500	.002625	.....	.....	
17,500	70,000	.028375	.002875	.....	.....	
18,000	72,000	.031875	.003500	.....	.....	
18,500	74,000	.035500	.003625	.....	.....	
19,000	76,000	.039500	.004000	.....	.....	
19,500	78,000	.044000	.004500	.....	.....	
20,000	80,000	.049625	.005625	.....	.....	
20,500	82,000	.0550	.005375	.....	.....	
21,000	84,000	.0675	.0125	.....	.....	
21,500	86,000	.0800	.0125	.....	.....	
22,000	88,000	.1075	.0275	.....	.....	
22,070	88,280	.1325	.0250	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	88,280
Elastic limit per square inch of original section	do	46,000
Elongation per inch after rupture	inch	.2000
Elongation per inch under strain at elastic limit	do	.001575
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		"1.20 from neck
Character of broken surface		silky
Elongation of inch sections		".08, ".11, ".24, ".37"

No. 3966.

Marks, $^{10}_{M}\ ^{W}_{T_2}\ ^{R}_{M}\ ^{T}$
Diameter, ".564.
Sectional area, .25 square inch.
Ganged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000275	.000150	.....	.....	
5,000	20,000	.000575	.000300	.....	.....	
7,500	30,000	.000975	.000400	.....	.....	
8,750	35,000	.001100	.000125	0.	.....	
10,000	40,000	.001275	.000175	0.	.....	
10,250	41,000	.001300	.000025	.....	.....	
10,500	42,000	.001325	.000025	.....	.....	
10,750	43,000	.001350	0.	.....	.....	
11,000	44,000	.001400	.000050	.....	.....	
11,250	45,000	.001475	.000075	.....	.....	
11,500	46,000	.001500	.000025	.....	.....	
11,750	47,000	.001525	.000025	.....	.....	Elastic limit.
12,000	48,000	.001675	.000050	.....	.....	
12,250	49,000	.004000	.002325	.....	.....	
12,500	50,000	.004950	.000950	.....	.....	
13,000	52,000	.007250	.002300	.....	.....	
13,500	54,000	.009500	.002250	.....	.....	
14,000	56,000	.010750	.001250	.....	.....	
14,500	58,000	.013700	.002950	.....	.....	
15,000	60,000	.014375	.000675	.....	.....	
15,500	62,000	.016250	.001875	.....	.....	
16,000	64,000	.018450	.002200	.....	.....	
16,500	66,000	.020625	.002175	.....	.....	
17,000	68,000	.023250	.002625	.....	.....	
17,500	70,000	.026000	.002750	.....	.....	
18,000	72,000	.028750	.002750	.....	.....	
18,500	74,000	.031750	.003000	.....	.....	
19,000	76,000	.036550	.004800	.....	.....	
19,500	78,000	.039000	.002450	.....	.....	
20,000	80,000	.043750	.004750	.....	.....	
20,500	82,000	.049375	.005625	.....	.....	
21,000	84,000	.0550	.005625	.....	.....	
21,500	86,000	.0675	.0125	.....	.....	
22,000	88,000	.0800	.0125	.....	.....	
22,500	90,000	.1150	.0350	.....	.....	
22,610	90,440	.1425	.0275	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,440
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.1650
Elongation per inch under strain at elastic limit	do...	.001525
Reduction in diameter at point of rupture	do. .	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		1", 25 from neck
Character of broken surface		granular 60 per cent., silky oblique 40 per cent.
Elongation of inch sections		".20, ".26", ".11, ".09

No. 3967.

Marks, $^{10\ W\ R\ T}_{M\ T,\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000275	.000150	.....	.....	
5,000	20,000	.000625	.000350	.....	.....	
7,500	30,000	.001000	.000375	.....	.....	
8,750	35,000	.001150	.000150	0.	.....	
10,000	40,000	.001275	.000125	0.	.....	
10,250	41,000	.001300	.000025	.....	.....	
10,500	42,000	.001325	.000025	.....	.....	
10,750	43,000	.001375	.000050	.....	.....	
11,000	44,000	.001425	.000050	.....	.....	Elastic limit.
11,250	45,000	.001625	.000200	.....	.....	
11,500	46,000	.005250	.003625	.....	.....	
11,750	47,000	.005850	.000600	.....	.....	
12,000	48,000	.006275	.000425	.....	.....	
12,250	49,000	.006950	.000675	.....	.....	
12,500	50,000	.008075	.001125	.....	.....	
13,000	52,000	.010000	.001925	.....	.....	
13,500	54,000	.011875	.001875	.....	.....	
14,000	56,000	.013750	.001875	.....	.....	
14,500	58,000	.016000	.002250	.....	.....	
15,000	60,000	.018000	.002000	.....	.....	
15,500	62,000	.020375	.002375	.....	.....	
16,000	64,000	.022800	.002475	.....	.....	
16,500	66,000	.025500	.002700	.....	.....	
17,000	68,000	.028375	.002875	.....	.....	
17,500	70,000	.031250	.002875	.....	.....	
18,000	72,000	.034750	.003500	.....	.....	
18,500	74,000	.038500	.003750	.....	.....	
19,000	76,000	.043375	.004875	.....	.....	
19,500	78,000	.048375	.005000	.....	.....	
20,000	80,000	.0550	.006625	.....	.....	
20,500	82,000	.0675	.0125	.....	.....	
21,000	84,000	.0775	.0100	.....	.....	
21,500	86,000	.0950	.0175	.....	.....	
21,990	87,960	.1475	.0525	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,960
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001425
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		2". 20 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".14, ".32, ".22, ".14

No. 3968.

Marks, 10 W R T / M T. O
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000275	.000150	.....	.....	
5,000	20,000	.000600	.000325	.....	.....	
7,500	30,000	.001000	.000400	.....	.....	
8,750	35,000	.001150	.000150	0.	.....	
10,000	40,000	.001275	.000125	0.	.....	
10,250	41,000	.001325	.000050	.....	.....	
10,500	42,000	.001375	.000050	.....	.....	
10,750	43,000	.001425	.000050	.....	.....	
11,000	44,000	.001475	.000050	.....	.....	
11,250	45,000	.001500	.000025	.....	.....	
11,500	46,000	.001525	.000025	.....	.....	
11,750	47,000	.001750	.000025	.....	.....	Elastic limit.
12,000	48,000	.001750	.000200	.....	.....	
12,250	49,000	.006250	.005000	.....	.....	
12,500	50,000	.008625	.001875	.....	.....	
13,000	52,000	.009650	.001025	.....	.....	
13,500	54,000	.011700	.002050	.....	.....	
14,000	56,000	.013700	.002000	.....	.....	
14,500	58,000	.016000	.002300	.....	.....	
15,000	60,000	.018125	.002125	.....	.....	
15,500	62,000	.020500	.002375	.....	.....	
16,000	64,000	.023250	.002750	.....	.....	
16,500	66,000	.026000	.002750	.....	.....	
17,000	68,000	.029125	.003125	.....	.....	
17,500	70,000	.033000	.003875	.....	.....	
18,000	72,000	.036000	.003000	.....	.....	
18,500	74,000	.040500	.004500	.....	.....	
19,000	76,000	.045000	.004500	.....	.....	
19,500	78,000	.051250	.006250	.....	.....	
20,000	80,000	.0575	.006250	.....	.....	
20,500	82,000	.0700	.0125	.....	.....	
21,000	84,000	.0825	.0125	.....	.....	
21,500	86,000	.1075	.0250	.....	.....	
21,720	86,880	.1600	.0525	.....	.....	Tensile strength.

General summary.

sile strength per square inch of original section	pounds..	86,880
stic limit per square inch of original section	do...	47,000
gation per inch after rupture	inch...	.2150
gation per inch under strain at elastic limit	do...	.001550
luction in diameter at point of rupture	do...	.164
luction in area after rupture, per centum of original section		49.7
ition of rupture		2" from neck
racter of broken surface		silky
gation of inch sections		".13, ".16, ".42", ".1

No. 3969.

Marks, $\frac{10\ W\ R\ T.}{M\ T.\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000675	.000375	.....	.....	
7,500	30,000	.001025	.000350	.....	.....	
8,750	35,000	.001200	.000175	0.	.....	
10,000	40,000	.001375	.000175	0.	.....	
10,250	41,000	.001425	.000050	.....	.....	
10,500	42,000	.001450	.000025	.....	.....	
10,750	43,000	.001475	.000025	.....	.....	
11,000	44,000	.001525	.000050	.....	.....	
11,250	45,000	.001575	.000050	.....	.....	Elastic limit.
11,500	46,000	.003500	.001925	.....	.....	
11,750	47,000	.005025	.001525	.....	.....	
12,000	48,000	.006000	.000975	.....	.....	
12,250	49,000	.006500	.000500	.....	.....	
12,500	50,000	.007675	.001175	.....	.....	
13,000	52,000	.009625	.001950	.....	.....	
13,500	54,000	.011625	.002000	.....	.....	
14,000	56,000	.013500	.001875	.....	.....	
14,500	58,000	.015500	.002000	.....	.....	
15,000	60,000	.017800	.002300	.....	.....	
15,500	62,000	.020775	.002975	.....	.....	
16,000	64,000	.023750	.001975	.....	.....	
16,500	66,000	.025625	.002875	.....	.....	
17,000	68,000	.028750	.003125	.....	.....	
17,500	70,000	.031875	.003125	.....	.....	
18,000	72,000	.035625	.003750	.....	.....	
18,500	74,000	.039575	.003950	.....	.....	
19,000	76,000	.044500	.004925	.....	.....	
19,500	78,000	.051000	.006500	.....	.....	
20,000	80,000	.058250	.007250	.....	.....	
20,500	82,000	.0700	.011750	.....	.....	
21,000	84,000	.0825	.0125	.....	.....	
21,500	86,000	.1075	.0250	.....	.....	
21,700	86,800	.1450	.0375	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,800
Elastic limit per square inch of original section	do....	45,000
Elongation per inch after rupture	inch..	.3175
Elongation per inch under strain at elastic limit	do....	.001575
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		2" from neck
Character of broken surface		silky
Elongation of inch sections		".15, ".43*, ".16, ".13

No. 814.

Marks, $\frac{10\ W\ R\ T}{B\ T, I}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000167	.000167	.....	.....	
5,000	10,000	.000333	.000166	.....	.....	
7,500	15,000	.000500	.000167	.....	.....	
10,000	20,000	.000667	.000167	0.	.....	
12,500	25,000	.000833	.000166	.....	.....	
15,000	30,000	.001000	.000167	.000067	.000067	
15,500	31,000	.001033	.000033	.....	.....	
16,000	32,000	.001067	.000034	.....	.....	
16,500	33,000	.001100	.000033	.....	.....	
17,000	34,000	.001133	.000033	.....	.....	
17,500	35,000	.001167	.000034	.000133	.000066	
18,000	36,000	.001200	.000033	.....	.....	
18,500	37,000	.001233	.000033	.....	.....	
19,000	38,000	.001300	.000067	.....	.....	
19,500	39,000	.001333	.000033	.....	.....	
20,000	40,000	.001400	.000077	.000300	.000167	Elastic limit.
20,500	41,000	.001500	.000100	.....	.....	
21,000	42,000	.001633	.000133	.....	.....	
21,500	43,000	.001767	.000134	.....	.....	
22,000	44,000	.003000	.001233	.....	.....	
22,500	45,000	.006400	.003000	.....	.....	
23,000	46,000	.006600	.000600	.....	.....	
23,500	47,000	.007000	.000400	.....	.....	
24,000	48,000	.007700	.000700	.....	.....	
24,500	49,000	.008500	.000800	.....	.....	
25,000	50,000	.009500	.001000	.....	.....	
38,050	76,100	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 815.

Marks, $^{10\ W\ R\ T}_{B\ T,O}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000267	.000134	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000600	.000167	0.	.....	
12,500	25,000	.000767	.000167	.....	.....	
15,000	30,000	.000933	.000166	0.	.....	
17,500	35,000	.001100	.000167	.....	.....	
18,000	36,000	.001133	.000033	.....	.....	
18,500	37,000	.001167	.000034	.....	.....	
19,000	38,000	.001200	.000033	.....	.....	
19,500	39,000	.001233	.000033	.....	.....	
20,000	40,000	.001300	.000067	.000067	.000067	
20,500	41,000	.001367	.000067	.....	.....	Elastic limit.
21,000	42,000	.001500	.000133	.....	.....	
21,500	43,000	.001600	.000100	.....	.....	
22,000	44,000	.001700	.000100	.....	.....	
22,500	45,000	.001967	.000267	.....	.....	
23,000	46,000	.002500	.000533	.....	.....	
23,500	47,000	.003333	.000833	.....	.....	
24,000	48,000	.004500	.001167	.....	.....	
24,500	49,000	.005800	.001300	.....	.....	
25,000	50,000	.007233	.001433	.....	.....	
39,520	79,040	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 816.

Marks, $\frac{10\ W\ R\ T}{B\ E}$.
Length, 4″.27.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000067	.000067			
5,000	10,000	.000233	.000166			
7,500	15,000	.000367	.000134			
10,000	20,000	.000533	.000166	0.		
12,500	25,000	.000700	.000167			
15,000	30,000	.000867	.000167	0.		
17,500	35,000	.001033	.000166			
18,000	36,000	.001033	0.			
18,500	37,000	.001067	.000034			
19,000	38,000	.001100	.000033			
19,500	39,000	.001133	.000033			
20,000	40,000	.001167	.000034	0.		
20,500	41,000	.001200	.000033			Elastic limit.
21,000	42,000	.001333	.000133			
21,500	43,000	.001500	.000167			
22,000	44,000	.002867	.001367			
22,500	45,000	.003333	.000466			
23,000	46,000	.003900	.000567			
23,500	47,000	.004567	.000667			
24,000	48,000	.005200	.000633			
24,500	49,000	.005967	.000767			
25,000	50,000	.006767	.000800			
44,950	89,900					Ultimate strength.

Failed by triple flexure.

No. 817.

Marks, $\frac{10\,W\,R\,T}{B\,B_{10}}$
Length, 4′.42.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3′.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000267	.000134	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000600	.000167	0.	.....	
12,500	25,000	.000767	.000167	.....	.....	
15,000	30,000	.000933	.000166	0.	.....	
17,500	35,000	.001133	.000200	.....	.....	
18,000	36,000	.001167	.000034	.....	.....	
18,500	37,000	.001200	.000033	.....	.....	
19,000	38,000	.001233	.000033	.....	.....	
19,500	39,000	.001300	.000067	.....	.....	Elastic limit.
20,000	40,000	.001433	.000133	.000200	.000200	
20,500	41,000	.001567	.000134	.....	.....	
21,000	42,000	.001733	.000166	.....	.....	
21,500	43,000	.002333	.000600	.....	.....	
22,000	44,000	.003600	.001267	.....	.....	
22,500	45,000	.004467	.000867	.....	.....	
23,000	46,000	.005067	.000600	.....	.....	
23,500	47,000	.005833	.000766	.....	.....	
24,000	48,000	.006567	.000734	.....	.....	
24,500	49,000	.007433	.000866	.....	.....	
25,000	50,000	.008467	.001034	.....	.....	
43,400	86,800	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 818.

Marks, $\frac{10\ W\ R\ T}{M\ T,\ I}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000267	.000134	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000600	.000167	.....	.....	
12,500	25,000	.000767	.000167	.....	.....	
15,000	30,000	.000933	.000166	.000033	.000033	
17,500	35,000	.001100	.000167	.....	.....	
20,000	40,000	.001333	.000233	.000067	.000034	
20,500	41,000	.001367	.000034	.....	.....	
21,000	42,000	.001400	.000033	.....	.....	
21,500	43,000	.001433	.000033	.....	.....	
22,000	44,000	.001467	.000034	.....	.....	
22,500	45,000	.001500	.000033	.....	.....	
23,000	46,000	.001567	.000067	.....	.....	Elastic limit.
23,500	47,000	.001867	.000300	.....	.....	
24,000	48,000	.003400	.001533	.....	.....	
24,500	49,000	.006733	.003333	.....	.....	
25,000	50,000	.007100	.000367	.....	.....	
25,500	51,000	.007667	.000567	.....	.....	
26,000	52,000	.008500	.000833	.....	.....	
40,940	81,880	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 819.

Marks, $\frac{10\ W\ R\ T}{M\ T,O}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000267	.000134	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000567	.000134	0.	.....	
12,500	25,000	.000733	.000166	.....	.....	
15,000	30,000	.000900	.000167	0.	.....	
17,500	35,000	.001033	.000133	.....	.....	
20,000	40,000	.001167	.000134	0.	.....	
20,500	41,000	.001200	.000033	.....	.....	
21,000	42,000	.001233	.000033	.....	.....	
21,500	43,000	.001233	0.	.....	.....	
22,000	44,000	.001267	.000034	.....	.....	
22,500	45,000	.001300	.000033	.....	.....	
23,000	46,000	.001333	.000033	.....	.....	
23,500	47,000	.001367	.000034	.....	.....	
24,000	48,000	.001367	0.	.....	.....	Elastic limit.
24,500	49,000	.003567	.002200	.....	.....	
25,000	50,000	.005667	.002100	.....	.....	
25,500	51,000	.006333	.000666	.....	.....	
26,000	52,000	.007100	.000767	.....	.....	
38,710	77,420	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

10-INCH WIRE-WOUND RIFLE.

JACKET.

No. 4217.

Marks, $\frac{10\,W\,R\,J}{M\,T,\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
3,750	15,000	.000500	.000200	.....	.....	
5,000	20,000	.000667	.000167	0.	.....	
6,250	25,000	.000883	.000166	.....	.....	
7,500	30,000	.001033	.000200	.....	.....	
8,750	35,000	.001200	.000167	.....	.....	
10,000	40,000	.001367	.000167	.000067	.000067	
11,250	45,000	.001667	.000300	.....	.....	
12,500	50,000	.001933	.000266	.....	.....	
12,750	51,000	.001967	.000034	.....	.....	
13,000	52,000	.002067	.000100	.....	.....	Elastic limit. Not well defined.
13,250	53,000	.002167	.000100	.....	.....	
13,500	54,000	.002267	.000100	.....	.....	
13,750	55,000	.002400	.000133	.....	.....	
14,000	56,000	.002600	.000200	.....	.....	
14,250	57,000	.002767	.000167	.....	.....	
14,500	58,000	.003033	.000266	.....	.....	
14,750	59,000	.003267	.000234	.....	.....	
15,000	60,000	.003700	.000433	.....	.....	
15,500	62,000	.004600	.000900	.....	.....	
16,000	64,000	.005667	.001067	.....	.....	
16,500	66,000	.006967	.001300	.....	.....	
17,000	68,000	.008400	.001433	.....	.....	
17,500	70,000	.010000	.001600	.....	.....	
19,000	76,000	.0167	.0067	.....	.....	
20,000	80,000	.0267	.0100	.....	.....	
21,000	84,000	.0300	.0033	.....	.....	
21,940	87,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,760
Elastic limit per square inch of original section (not well defined)	do...	52,000
Elongation per inch after rupture	inch..	.0367
Elongation per inch under strain at elastic limit	do...	.002067
Reduction in diameter at point of rupture		.014
Reduction in area after rupture, per centum of original section		5.6
Position of rupture		". 35 from neck
Character of broken surface		granular, dark colored, spongy spot at circumference
Elongation of inch sections		". 06", ". 03, ". 02

No. 4219.

Marks, $^{10\ W\ R\ J}_{M\ T,\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	.....	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
3,750	15,000	.000500	.000167	.....	.....	
5,000	20,000	.000667	.000167	0.	.....	
6,250	25,000	.000900	.000233	.....	.....	
7,500	30,000	.001067	.000167	.....	.....	
8,750	35,000	.001267	.000200	.....	.....	
10,000	40,000	.001400	.000133	.000033	.000033	
11,250	45,000	.001667	.000267	.....	.....	
11,500	46,000	.001700	.000033	.....	.....	Elastic limit. Not well defined.
11,750	47,000	.001800	.000100	.....	.....	
12,000	48,000	.001933	.000133	.....	.....	
12,250	49,000	.002033	.000100	.....	.....	
12,500	50,000	.002100	.000067	.....	.....	
12,750	51,000	.002267	.000167	.....	.....	
13,000	52,000	.002567	.000300	.....	.....	
13,250	53,000	.003667	.001100	.....	.....	
13,500	54,000	.005000	.001333	.....	.....	
14,000	56,000	.006700	.001700	.....	.....	
14,500	58,000	.008333	.001633	.....	.....	
15,000	60,000	.010400	.002067	.....	.....	
16,000	64,000	.0133	.0029	.....	.....	
17,000	68,000	.0233	.0100	.....	.....	
18,000	72,000	.0333	.0100	.....	.....	
18,680	74,720	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,720
Elastic limit per square inch of original section, not well defined	do...	46,000
Elongation per inch after rupture	inch..	.0300
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.016
Reduction in area after rupture, per centum of original section		5.9
Position of rupture		1". 1 from neck
Character of broken surface		granular, dark-colored spongy metal at one side of specimen
Elongation of inch sections		".04", ".03, ".03

No. 4220.

Marks, $\frac{10\ W\ R\ J}{M\ T_2\ M}$
Diameter, ".563.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
3,750	15,000	.000500	.000200	.....	.....	
5,000	20,000	.000667	.000167	0.	.....	
6,250	25,000	.000833	.000166	.....	.....	
7,500	30,000	.001033	.000200	.....	.....	
8,750	35,000	.001267	.000234	.....	.....	
10,000	40,000	.001500	.000233	.000133	.000133	
10,250	41,000	.001567	.000067	.....	.....	
10,500	42,000	.001633	.000066	.....	.....	Elastic limit.
10,750	43,000	.002000	.000367	.....	.....	
11,000	44,000	.002500	.000500	.....	.....	
11,250	45,000	.004000	.001500	.....	.....	
11,500	46,000	.007667	.003667	.....	.....	
11,750	47,000	.010400	.002733	.....	.....	
12,000	48,000	.011333	.000933	.....	.....	
12,250	49,000	.012667	.001334	.....	.....	
12,500	50,000	.014000	.001333	.....	.....	
12,666	52,000	.016667	.002667	.....	.....	
12,500	54,000	.0200	.003333	.....	.....	
14,000	56,000	.0233	.0033	.....	.....	
14,500	58,000	.0267	.0034	.....	.....	
15,000	60,000	.0300	.0033	.....	.....	
15,500	62,000	.0333	.0033	.....	.....	
16,000	64,000	.0400	.0067	.....	.....	Tensile strength.

General summary.

...ile strength per square inch of original section	pounds..	64,000
...stic limit per square inch of original section	do....	42,000
...gation per inch after rupture	inch..	.0600
...gation per inch under strain at elastic limit	do....	.001633
...uction in diameter at point of rupture	do....	.043
...uction in area after rupture, per centam of original section		15.0
...ation of rupture		".3 from neck
...acter of broken surface		dull silky, band of dark colored spongy metal extends across surface
...gation of inch sections		".04, ".04, "10*

No. 4221.

Marks, $\frac{10\ W\ R\ J}{M\ T_4\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
3,750	15,000	.000433	.000166	.....	.....	
5,000	20,000	.000567	.000134	0.	.....	
6,250	25,000	.000733	.000166	.....	.....	
7,500	30,000	.000933	.000200	.....	.....	
8,750	35,000	.001067	.000134	.....	.....	
10,000	40,000	.001267	.000200	0.	.....	
11,250	45,000	.001400	.000133	.....	.....	
12,000	48,000	.001600	.000200	.....	.....	
12,250	49,000	.001633	.000033	.....	.....	
12,500	50,000	.001700	.000067	.....	.....	
12,750	51,000	.001733	.000033	.....	.....	Elastic limit.
13,000	52,000	.001867	.000134	.....	.....	
13,250	53,000	.002000	.000133	.....	.....	
13,500	54,000	.002167	.000167	.....	.....	
13,750	55,000	.002500	.000333	.....	.....	
14,000	56,000	.003667	.001167	.....	.....	
14,500	58,000	.006033	.002366	.....	.....	
15,000	60,000	.007933	.001900	.....	.....	
15,500	62,000	.010000	.002067	.....	.....	
16,000	64,000	.011667	.001667	.....	.....	
16,500	66,000	.014000	.002333	.....	.....	
17,000	68,000	.016333	.002333	.....	.....	
17,500	70,000	.018667	.002334	.....	.....	
18,000	72,000	.021167	.002500	.....	.....	
18,500	74,000	.024167	.003000	.....	.....	
19,000	76,000	.0267	.002533	.....	.....	
19,500	78,000	.0300	.0033	.....	.....	
20,000	80,000	.0333	.0033	.....	.....	
20,500	82,000	.0367	.0034	.....	.....	
21,000	84,000	.0400	.0033	.....	.....	
21,500	86,000	.0500	.0100	.....	.....	
22,000	88,000	.0600	.0100	.....	.....	
22,500	90,000	.0733	.0133	.....	.....	
23,000	92,000	.1000	.0267	.....	.....	
23,120	92,480	.1233	.0233	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,480
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.1667
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.136
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		".5 from neck
Character of broken surface		silky
Elongation of inch sections		".11, ".10, ".29

No. 4222.

Marks, $\frac{10\ W\ R\ J}{B\ T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200			
3,750	15,000	.000467	.000167			
5,000	20,000	.000633	.000166	0.		
6,250	25,000	.000800	.000167			
7,500	30,000	.001000	.000200			
8,750	35,000	.001233	.000233			
10,000	40,000	.001400	.000167	0.		
11,250	45,000	.001633	.000233			
11,500	46,000	.001667	.000034			
11,750	47,000	.001700	.000033			
12,000	48,000	.001733	.000033			Elastic limit.
12,250	49,000	.001900	.000167			
12,500	50,000	.002167	.000267			
12,750	51,000	.002433	.000266			
13,000	52,000	.002933	.000500			
13,500	54,000	.003733	.000800			
14,000	56,000	.005833	.002100			
14,500	58,000	.008833	.003000			
15,000	60,000	.010667	.001833			
15,500	62,000	.012833	.002166			
16,000	64,000	.015000	.002167			
16,500	66,000	.017367	.002367			
17,000	68,000	.019833	.002466			
17,500	70,000	.023000	.003167			
18,000	72,000	.025833	.002833			
18,500	74,000	.029167	.003334			
19,000	76,000	.032667	.003500			
19,500	78,000	.036833	.004166			
20,000	80,000	.043000	.006167			
20,500	82,000	.0450	.0020			
21,000	84,000	.0567	.0117			
21,500	86,000	.0667	.0100			
22,000	88,000	.0897	.0200			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,000
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.1033
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		".4 from neck
Character of broken surface	granular, 50 per cent.; dull flaky, 50 per cent.	
Elongation of inch sections		".19", ".07, ".05

No. 4223.

Marks, $^{10\ W\ R\ J}_{B\ T,\ I}$
Diameter, ".560.
Sectional area, .246 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
246	1,000	0.	0.	0.	0.	Initial load.
1,230	5,000	.000167	.000167	.....	.....	
2,460	10,000	.000867	.000200	.....	.....	
3,690	15,000	.000533	.000166	.....	.....	
4,920	20,000	.000733	.000200	.....	.....	
6,150	25,000	.000933	.000200	.....	.....	
7,380	30,000	.001133	.000200	.....	.....	
8,610	35,000	.001300	.000167	.....	.....	
9,840	40,000	.001500	.000200	.....	.....	
11,070	45,000	.001767	.000267	.....	.....	
11,316	46,000	.001800	.000033	.....	.....	
11,562	47,000	.001867	.000067	.....	.....	
11,808	48,000	.001967	.000100	.....	.....	Elastic limit.
12,054	49,000	.002233	.000266	.....	.....	
12,300	50,000	.006400	.004167	.....	.....	
12,792	52,000	.011667	.005267	.....	.....	
20,140	81,870	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81,670
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	0.1900
Elongation per inch under strain at elastic limit	do...	.001967
Reduction in diameter at point of rupture	do...	.150
Reduction in area after rupture, per centum of original section		46.3
Position of rupture		".7 from neck
Character of broken surface		silky
Elongation of inch sections		".33", ".13, ".11

No. 4224.

Marks, $\frac{10\ W\ R\ J}{B\ T_5\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
3,750	15,000	.000400	.000133	.....	.....	
5,000	20,000	.000600	.000200	0.	.....	
6,250	25,000	.000767	.000167	.....	.....	
7,500	30,000	.000933	.000166	.....	.....	
8,750	35,000	.001100	.000167	.....	.....	
10,000	40,000	.001267	.000167	0.	.....	
11,250	45,000	.001533	.000266	.....	.....	
11,500	46,000	.001600	.000067	.....	.....	
11,750	47,000	.001633	.000033	.....	.....	
12,000	48,000	.001700	.000067	.....	.....	
12,250	49,000	.001733	.000033	.....	.....	Elastic limit.
12,500	50,000	.001900	.000167	.....	.....	
12,750	51,000	.002200	.000300	.....	.....	
13,000	52,000	.002533	.000333	.....	.....	
13,500	54,000	.003900	.001367	.....	.....	
14,000	56,000	.005633	.001733	.....	.....	
14,500	58,000	.007233	.001600	.....	.....	
15,000	60,000	.009233	.002000	.....	.....	
15,500	62,000	.011233	.002000	.....	.....	
16,000	64,000	.013367	.002134	.....	.....	
16,500	66,000	.015933	.002566	.....	.....	
17,000	68,000	.018533	.002600	.....	.....	
17,500	70,000	.021267	.002734	.....	.....	
18,000	72,000	.024367	.003100	.....	.....	
18,500	74,000	.028067	.003700	.....	.....	
19,000	76,000	.031267	.003200	.....	.....	
19,500	78,000	.035000	.003733	.....	.....	
20,000	80,000	.0367	.0017	.....	.....	
20,500	82,000	.0400	.0033	.....	.....	
21,000	84,000	.0500	.0100	.....	.....	
21,500	86,000	.0667	.0167	.....	.....	
21,920	87,680	.0933	.0266	.....	.....	Tensile strength.

General summary.

...sile strength per square inch of original section	pounds..	87,680
...stic limit per square inch of original section	do..	49,000
...ngation per inch after rupture	inch..	.1200
...ngation per inch under strain at elastic limit	do....	.001733
...ngation per inch under strain at point of rupture	do...	.134
...duction in diameter at point of rupture		41.9
...duction in area after rupture, per centum of original section		".35 from neck
...ture of rupture		silky
...ndle of broken surface		".04, ".06, "26"
...ngation of inch sections		

No. 4225.

Marks, $^{10\ W\ R\ J}_{B\ T_4\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000333	.000200			
3,750	15,000	.000500	.000167			
5,000	20,000	.000667	.000167	0.		
6,250	25,000	.000833	.000166			
7,500	30,000	.001033	.000200			
8,750	35,000	.001267	.000234			
10,000	40,000	.001467	.000200	.000067	.000067	
11,250	45,000	.001700	.000233			
11,500	46,000	.001767	.000067			
11,750	47,000	.001833	.000066			
12,000	48,000	.001900	.000067			
12,250	49,000	.001933	.000033			
12,500	50,000	.002033	.000100			
12,750	51,000	.002067	.000034			Elastic limit.
13,000	52,000	.002267	.000200			
13,250	53,000	.002400	.000133			
13,500	54,000	.002733	.000333			
13,750	55,000	.003067	.000334			
14,000	56,000	.003567	.000500			
14,500	58,000	.005267	.001700			
15,000	60,000	.007167	.001900			
15,500	62,000	.008600	.001433			
16,000	64,000	.010600	.002000			
16,500	66,000	.012600	.002000			
17,000	68,000	.015233	.002633			
17,500	70,000	.017167	.001934			
18,000	72,000	.019600	.002433			
18,500	74,000	.022000	.002400			
19,000	76,000	.025267	.003267			
19,500	78,000	.028933	.003666			
20,000	80,000	.032333	.003400			
20,500	82,000	.0350	.002667			
21,000	84,000	.0383	.0033			
21,500	86,000	.0433	.0050			
22,000	88,000	.0533	.0100			
22,500	90,000	.0667	.0134			
22,780	91,120					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,1
Elastic limit per square inch of original section	do...	51,0
Elongation per inch after rupture	inch..	.08
Elongation per inch under strain at elastic limit	do...	.0020
Reduction in diameter at point of rupture	do...	.0
Reduction in area after rupture, per centum of original section		18
Position of rupture		".4 from no
Character of broken surface...granular, flaky surface, 70 per cent.; dull, smooth surface, 30 per ce		
Elongation of inch sections		".15*, ".06, ".

RING A.

No. 3994.

Marks, $^{10\ W\ E_1\ A}_{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000124	0.	.....	
2,500	10,000	.000325	.000200	.....	.....	
5,000	20,000	.000650	.000325	.....	.....	
7,500	30,000	.001000	.000350	.....	.....	
10,000	40,000	.001325	.000325	.....	.....	
11,250	45,000	.001450	.000125	0.	.....	
12,500	50,000	.001675	.000225	.000025	.000025	
12,750	51,000	.001700	.000025	.....	.....	
13,000	52,000	.001750	.000050	.....	.....	
13,250	53,000	.001775	.000025	.....	.....	
13,500	54,000	.001825	.000050	.....	.....	
13,750	55,000	.001875	.000050	.....	.....	
14,000	56,000	.001950	.000075	.....	.....	
14,250	57,000	.002000	.000050	.....	.....	Elastic limit.
14,500	58,000	.002100	.000100	.....	.....	
14,750	59,000	.002200	.000100	.....	.....	
15,000	60,000	.002325	.000125	.....	.....	
15,500	62,000	.002675	.000350	.....	.....	
16,000	64,000	.003250	.000575	.....	.....	
16,500	66,000	.004125	.000875	.....	.....	
17,000	68,000	.005250	.001125	.....	.....	
17,500	70,000	.006575	.001325	.....	.....	
27,820	111,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	111,280
Elastic limit per square inch of original section	do	57,000
Elongation per inch after rupture	inch	.090
Elongation per inch under strain at elastic limit	do	.002000
Reduction in diameter at point of rupture	do	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		2".1 from neck
Character of broken surface		granular; small dull spot near the circumference
Elongation of inch sections		".05, ".15, ".10, ".06

No. 3995.

Marks, $\frac{10\ W\ R_1\ A}{T_2\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.		
2,500	10,000	.000200	.000125			
5,000	20,000	.000475	.000275			
7,500	30,000	.000825	.000350			
10,000	40,000	.001125	.000300			
11,250	45,000	.001300	.000175	0.		
12,500	50,000	.001550	.000250	0.		
12,750	51,000	.001600	.000050			
13,000	52,000	.001650	.000050			
13,250	53,000	.001700	.000050			
13,500	54,000	.001775	.000075			Elastic limit.
13,750	55,000	.001875	.000100			
14,000	56,000	.002000	.000125			
14,250	57,000	.002125	.000125			
14,750	59,000	.002550	.000425			
15,250	61,000	.003200	.000650			
15,750	63,000	.004250	.001050			
16,250	65,000	.005500	.001250			
16,750	67,000	.007075	.001575			
27,040	108,160					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,160
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1175
Elongation per inch under strain at elastic limit	do...	.001775
Reduction in diameter at point of rupture	do...	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		1".8 from neck
Character of broken surface		granular, dull spot at the circumference
Elongation of inch sections		".09, "20*, ".10, ".08

No. 3697.

Marks, $\frac{10\ W\ R_1\ A}{T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200			
5,000	20,000	.000625	.000325			
7,500	30,000	.001000	.000375			
10,000	40,000	.001325	.000325			
11,250	45,000	.001500	.000175	.000100	.000100	
12,500	50,000	.001800	.000300	.000100	0.	
12,750	51,000	.001850	.000050			
13,000	52,000	.001925	.000075			Elastic limit.
13,250	53,000	.002000	.000075			
13,540	54,000	.002175	.000175			
13,750	55,000	.002375	.000200			
14,000	56,000	.002625	.000250			
14,500	58,000	.003300	.000675			
15,000	60,000	.004250	.000950			
15,500	62,000	.005250	.001000			
16,000	64,000	.006550	.001300			
16,500	66,000	.008125	.001575			Tensile strength.
26,520	106,080					

General summary.

Tensile strength per square inch of original section	pounds..	106,080
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.1125
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		1" .45 from neck
Character of broken surface		granular, dull spot at the circumference
Elongation of inch sections		".05, ".09, "10*, ".12

Hoop C_3.

No. 4302.

Marks, $\frac{10\ W\ R_1\ C_3}{T_1\ I}$
Diameter, ".567.
Sectional area, .252 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000175	.000175			
2,520	10,000	.000300	.000125			
2,780	15,000	.000475	.000175			
5,040	20,000	.000650	.000175			
6,300	25,000	.000775	.000125			
7,056	28,000	.000850	.000075			Elastic limit.
7,560	30,000	.001250	.000400	.000575	.000575	
7,812	31,000	.009500	.008250			
8,064	32,000	.011125	.001625			
8,316	33,000	.011750	.000625			
8,568	34,000	.012750	.001000			
8,820	35,000	.014000	.001250			
9,072	36,000	.015425	.001425			
9,324	37,000	.016625	.001200			
9,576	38,000	.018000	.001375			
9,828	39,000	.019125	.001125			
10,080	40,000	.020750	.001625			
10,584	42,000	.0225	.001750			
11,088	44,000	.0250	.0025			
11,592	46,000	.0275	.0025			
12,096	48,000	.0300	.0025			
12,600	50,000	.0375	.0075			
13,104	52,000	.0425	.0050			
13,608	54,000	.0475	.0050			
14,112	56,000	.0550	.0075			
14,616	58,000	.0675	.0125			
15,120	60,000	.0800	.0125			
15,624	62,000	.0950	.0150			
16,128	64,000	.1175	.0225			
16,632	66,000	.1775	.0600			
16,640	66,030					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	66,030
Elastic limit per square inch of original section	do...	28,000
Elongation per inch after rupture	inch..	.2700
Elongation per inch under strain at elastic limit	do...	.000850
Reduction in diameter at point of rupture	do...	.137
Reduction in area after rupture, per centum of original section		42.4
Position of rupture		2".25 from neck

Character of broken surface, granular, 50 per cent.; silky, 50 per cent. Opened cracks in surface of stem.

Elongation of inch sections ".18, ".25 ".43*. ".22

No. 4303.

Marks, $\frac{12\ W\ E_2\ C_3}{T_2\ O}$
Diameter, ".566.
Sectional area, .252 square inch.
Gauged length 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000150	.000150	0.		
2,520	10,000	.000300	.000150			
3,780	15,000	.000450	.000150			
5,040	20,000	.000650	.000200	0.		
6,300	25,000	.000825	.000175			
6,552	26,000	.000875	.000050			
6,804	27,000	.000925	.000050			Elastic limit.
7,056	28,000	.001200	.000275			
7,308	29,000	.008375	.007175			
7,560	30,000	.009550	.001175			
8,064	32,000	.011125	.001575			
8,568	34,000	.013500	.002375			
9,072	36,000	.015450	.001950			
9,576	38,000	.018250	.002800			
10,080	40,000	.021000	.002750			
10,584	42,000	.0225	.0015			
11,088	44,000	.0250	.0025			
11,592	46,000	.0275	.0025			
12,096	48,000	.0300	.0025			
12,600	50,000	.0400	.0100			
13,104	52,000	.0475	.0075			
13,608	54,000	.0550	.0075			
14,112	56,000	.0600	.0050			
14,616	58,000	.0700	.0100			
15,120	60,000	.0775	.0075			
15,624	62,000	.0950	.0175			
16,128	64,000	.1250	.0300			
16,479	65,360	.1800	.0550			Tensile strength.

General summary.

...sile strength per square inch of original section	pounds	65,360
...stic limit per square inch of original section	do	27,000
...ngation per inch after rupture	inch	.1800
...ngation per inch under strain at elastic limit	do	.000925
...duction in diameter at point of rupture	do	.086
...duction in area after rupture, per centum of original section		28.2
...ation of rupture		".35 from neck
...racter of broken surface		granular, dull spot at circumference
...gation of inch sections		".15, ".16, ".18, ".23

Hoop C_4.

No. 4304.

Marks, $^{10\,W\,R_1\,C_4}_{T_1\,M}$
Diameter, ".566.
Sectional area, .252 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000150	.000150	0.	.....	
2,520	10,000	.000300	.000150	.....	.....	
3,780	15,000	.000500	.000200	.....	.....	
5,040	20,000	.000675	.000175	.000025	.000025	
6,300	25,000	.000800	.000125	.....	.....	
7,560	30,000	.001025	.000225	.....	.....	
7,812	31,000	.001050	.000025	.....	.....	
8,064	32,000	.001125	.000075	.....	.....	
8,316	33,000	.001175	.000050	.....	.....	
8,568	34,000	.001225	.000050	.....	.....	
8,820	35,000	.001250	.000025	.....	.....	
9,072	36,000	.001275	.000025	.....	.....	
9,324	37,000	.001300	.000025	.....	.....	Elastic limit.
9,576	38,000	.001450	.000150	.....	.....	
9,828	39,000	.012125	.010675	.....	.....	
10,080	40,000	.014175	.002050	.....	.....	
10,584	42,000	.016000	.001825	.....	.....	
11,088	44,000	.018750	.002750	.....	.....	
11,592	46,000	.021875	.003125	.....	.....	
12,096	48,000	.024500	.002625	.....	.....	
12,600	50,000	.028500	.004000	.....	.....	
13,104	52,000	.0325	.0040	.....	.....	
13,608	54,000	.0375	.0050	.....	.....	
14,112	56,000	.0425	.0050	.....	.....	
14,616	58,000	.0475	.0050	.....	.....	
15,120	60,000	.0550	.0075	.....	.....	
15,624	62,000	.0625	.0075	.....	.....	
16,128	64,000	.0750	.0125	.....	.....	
16,632	66,000	.0875	.0125	.....	.....	
17,136	68,000	.1075	.0200	.....	.....	
17,640	70,000	.1650	.0575	.....	.....	
17,680	70,190	.2000	.0350	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,190
Elastic limit per square inch of original section	do...	37,000
Elongation per inch after rupture	inch..	.2650
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.156
Reduction in area after rupture, per centum of original section		47.6
Position of rupture		1".50 from neck
Character of broken surface		fine, silky
Elongation of inch sections		".17, ".21, ".32, ".36

No. 4305.

Marks, $\frac{10\ W\ B_1\ C_4}{T_1\ I}$
Diameter, ".565.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.		
2,500	10,000	.000250	.000125			
3,750	15,000	.000450	.000200			
5,000	20,000	.000650	.000200	0.		
6,250	25,000	.000800	.000150			
7,500	30,000	.000975	.000175			
7,750	31,000	.001000	.000025			
8,000	32,000	.001050	.000050			
8,250	33,000	.001125	.000075			
8,500	34,000	.001175	.000050			
8,750	35,000	.001200	.000025			
9,000	36,000	.001250	.000050			
9,250	37,000	.001300	.000050			
9,500	38,000	.001375	.000075			Elastic limit.
9,750	39,000	.011250	.009875			
10,000	40,000	.012125	.000875			
10,250	41,000	.012925	.000800			
10,500	42,000	.014000	.001075			
10,750	43,000	.015000	.001000			
11,000	44,000	.016750	.001750			
11,500	46,000	.019250	.002500			
12,000	48,000	.021875	.002625			
12,500	50,000	.026000	.004125			
13,000	52,000	.029750	.003750			
13,500	54,000	.033500	.003750			
14,000	56,000	.038125	.004625			
14,500	58,000	.0425	.004375			
15,000	60,000	.0500	.0075			
15,500	62,000	.0575	.0075			
16,000	64,000	.0675	.0100			
16,500	66,000	.0800	.0125			
17,000	68,000	.1000	.0200			
17,500	70,000	.1250	.0250			
17,760	71,040	.1950	.0700			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	71,040
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.2525
Elongation per inch under strain at elastic limit	do...	.001375
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1".6 from neck
Character of broken surface		silky oblique
Diameters of inch sections		".25, ".38+, ".21, ".17

No. 4306.

Marks, $\frac{10\ W\ R_2C_4}{T_2\ O}$
Diameter, ".567
Sectional area, .252 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000150	.000150	0.		
2,520	10,000	.000300	.000150			
3,780	15,000	.000475	.000175			
5,040	20,000	.000650	.000175	0.		
6,300	25,000	.000800	.000150			
7,560	30,000	.000975	.000175			
8,820	35,000	.001200	.000225			
9,072	36,000	.001250	.000050			
9,324	37,000	.001275	.000025			
9,576	38,000	.001300	.000025			
9,828	39,000	.001325	.000025			Elastic limit.
10,080	40,000	.001425	.000100			
10,332	41,000	.006550	.005125			
10,584	42,000	.009950	.003400			
11,088	44,000	.011875	.001925			
11,592	46,000	.013750	.001875			
12,096	48,000	.015500	.001750			
12,600	50,000	.018125	.002625			
13,104	52,000	.021000	.002875			
13,608	54,000	.023200	.002200			
14,112	56,000	.026250	.003050			
14,616	58,000	.029125	.002875			
15,120	60,000	.031250	.002121			
15,624	62,000	.0375	.006250			
16,128	64,000	.0425	.0050			
16,632	66,000	.0475	.0050			
17,136	68,000	.0525	.0050			
17,640	70,000	.0575	.0050			
18,144	72,000	.0700	.0125			
18,648	74,000	.0800	.0100			
19,152	76,000	.0975	.0175			
19,656	78,000	.1250	.0275			
19,810	78,610	.1575	.0325			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	78,610
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1725
Elongation per inch under strain at elastic limit	do...	.001325
Reduction in diameter at point of rupture	do...	.067
Reduction in area after rupture, per centum of original section		28.2
Position of rupture		".75 from neck
Character of broken surface		fine granular, 60 per cent.; silky serrated, 40 per cent.
Elongation of inch sections		".25", ".16, ".15, ".13

Hoop C_5.

No. 4307.

Marks, $^{10\ W\ R_1\ C_5}_{T_1\ M}$
Diameter, ".567.
Sectional area, .252 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	
1,260	5,000	.000125	.000125	0.	.....	Initial load.
2,520	10,000	.000275	.000150	.....	.....	
3,780	15,000	.000450	.000175	.....	.....	
5,040	20,000	.000675	.000225	0.	.....	
6,300	25,000	.000800	.000125	.....	.....	
7,560	30,000	.001000	.000200	.....	.....	
7,812	31,000	.001025	.000025	.....	.....	
8,064	32,000	.001050	.000025	.....	.....	
8,316	33,000	.001075	.000025	.....	.....	
8,568	34,000	.001125	.000050	.....	.....	
8,820	35,000	.001175	.000050	.....	.....	
9,072	36,000	.001225	.000050	.....	.....	
9,324	37,000	.001275	.000050	.....	.....	Elastic limit.
9,576	38,000	.004000	.002725	.....	.....	
9,828	39,000	.005500	.001500	.....	.....	
10,080	40,000	.011500	.006000	.....	.....	
10,584	42,000	.020625	.009125	.....	.....	
11,088	44,000	.024000	.003375	.....	.....	
11,592	46,000	.028125	.004125	.....	.....	
12,096	48,000	.032500	.004375	.....	.....	
12,600	50,000	.0400	.0075	.....	.....	
13,104	52,000	.0450	.0050	.....	.....	
13,608	54,000	.0500	.0050	.....	.....	
14,112	56,000	.0575	.0075	.....	.....	
14,616	58,000	.0700	.0125	.....	.....	
15,120	60,000	.0825	.0125	.....	.....	
15,400	61,110	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	61,110
Elastic limit per square inch of original section	do	37,000
Elongation per inch after rupture	inch	.1150
Elongation per inch under strain at elastic limit	do	.001275
Reduction in diameter at point of rupture	do	.067
Reduction in area after rupture, per centum of original section		22.2
Position of rupture		2" from neck
Character of broken surface		silky
Elongation of inch sections		".10, ".17, ".10, ".09

No. 4308.

Marks, $^{10\ W\ R_1\ C_5}_{T_2\ M}$
Diameter, ″.566.
Sectional area, .252 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000150	.000150	0.	.....	
2,520	10,000	.000275	.000125	.....	.....	
3,780	15,000	.000475	.000200	.....	.....	
5,040	20,000	.000625	.000150	0.		
6,300	25,000	.000775	.000150	.....	.....	
7,560	30,000	.000975	.000200	.....	.....	
8,820	35,000	.001175	.000200	.....	.....	
9,072	36,000	.001225	.000050	.....	.....	
9,324	37,000	.001250	.000025	.....	.....	
9,576	38,000	.001300	.000050	.....	.....	
9,828	39,000	.001350	.000050	.....	.....	
10,080	40,000	.001400	.000050	.....	.....	Elastic limit.
10,332	41,000	.023375	.021975	.....	.....	
10,584	42,000	.024950	.001575	.....	.....	
10,836	43,000	.026250	.001300	.....	.....	
11,088	44,000	.028500	.002250	.....	.....	
11,592	46,000	.033925	.005425	.....	.....	
12,096	48,000	.038250	.004325	.....	.....	
12,600	50,000	.0425	.004250	.....	.....	
13,104	52,000	.0500	.0075	.....	.....	
13,608	54,000	.0600	.0100	.....	.....	
14,112	56,000	.0700	.0100	.....	.....	
14,616	58,000	.0875	.0175	.....	.....	
15,120	60,000	.1075	.0200	.....	.....	
15,550	61,710	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	61,700
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.116
Reduction in area after rupture, per centum of original section		36.9
Position of rupture		1″.35 from neck
Character of broken surface.....silky; metal ruptured at a crack which extended from the circumference to the center of the specimen. The walls of the crack were dark colored.		
Elongation of inch sections		″.13, ″.15, ″.15, ″.25

No. 4309.

Marks, $^{10\ W\ R_j\ C_s}_{T_r\ M}$
Diameter, ″.567.
Sectional area, .252 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	.0	Initial load.
1,260	5,000	.000150	.000150	0.		
2,520	10,000	.000300	.000150			
3,780	15,000	.000450	.000150			
5,040	20,000	.000675	.000225	0.		
6,300	25,000	.000825	.000150			
7,560	30,000	.001000	.000175			
8,820	35,000	.001200	.000200			
9,072	36,000	.001250	.000050			
9,324	37,000	.001275	.000025			
9,576	38,000	.001300	.000025			
9,828	39,000	.001375	.000075			Elastic limit.
10,080	40,000	.008950	.007575			
10,332	41,000	.011125	.002175			
10,584	42,000	.019450	.008325			
11,088	44,000	.022450	.003000			
11,340	45,000	.026125	.003675			
11,592	46,000	.029750	.003625			
11,844	47,000	.034750	.005000			
12,096	48,000	.040250	.005500			
12,348	49,000	.0475	.007250			
12,600	50,000	.0525	.0050			
13,104	52,000	.0625	.0100			
13,608	54,000	.0750	.0125			
14,112	56,000	.0950	.0200			
14,616	58,000	.1175	.0225			
15,120	60,000	.1500	.0325			Tensile strength.
15,624	62,000					
16,128	64,000					
16,279	64,560					

General summary.

Tensile strength per square inch of original section	pounds	64,560
Elastic limit per square inch of original section	do	39,000
Elongation per inch after rupture	inch	.1500
Elongation per inch under strain at elastic limit	do	.001375
Elongation per inch at point of rupture	do	.087
Reduction in diameter at point of rupture		28.2
Reduction in area after rupture, per centum of original section		
Position of rupture		″.35 from neck
Character of broken surface		silky; contains two small spots of light colored metal
Elongation of inch sections		″.10, ″.11, ″.16, ″.23*

Hoop C_6.

No. 4310.

Marks, $\frac{10\ W\ B_1\ C_6}{T_1\ M}$
Diameter, ".566.
Sectional area, .252 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000150	.000150	0.	.....	
2,520	10,000	.000325	.000175	.....	.....	
3,780	15,000	.000500	.000175	.....	.....	
5,040	20,000	.000675	.000175	0.	.....	
6,300	25,000	.000800	.000125	.....	.....	
7,560	30,000	.001000	.000200	.....	.....	
8,820	35,000	.001175	.000175	.....	.....	
9,072	36,000	.001225	.000050	.....	.....	
9,324	37,000	.001250	.000025	.....	.....	
9,576	38,000	.001275	.000025	.....	.....	
9,828	39,000	.001300	.000025	.....	.....	Elastic limit.
10,080	40,000	.005375	.004075	.....	.....	
10,332	41,000	.007925	.002550	.....	.....	
10,584	42,000	.015750	.007825	.....	.....	
11,088	44,000	.022625	.006875	.....	.....	
11,592	46,000	.025300	.002675	.....	.....	
12,096	48,000	.029750	.004450	.....	.....	
12,600	50,000	.034250	.004500	.....	.....	
13,104	52,000	.038125	.003875	.....	.....	
13,608	54,000	.0450	.006875	.....	.....	
14,112	56,000	.0500	.0050	.....	.....	
14,616	58,000	.0550	.0050	.....	.....	
15,120	60,000	.0675	.0125	.....	.....	
15,624	62,000	.0775	.0100	.....	.....	
16,128	64,000	.0925	.0150	.....	.....	
16,632	66,000	.1175	.0250	.....	.....	
17,136	68,000	.1600	.0425	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	68,000
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do..	.001300
Reduction in diameter at point of rupture	do...	.096
Reduction in area after rupture, per centum of original section		31.0
Position of rupture		".75 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".16, ".18, ".18, ".30"

No. 4311.

Marks, $^{10}_{T,M}$ W B, C.
Diameter, ".567.
Sectional area, .252 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Sucessive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000125	.000125	0.		
2,520	10,000	.000300	.000175			
3,780	15,000	.000475	.000175			
5,040	20,000	.000650	.000175	0.		
6,300	25,000	.000800	.000150			
7,560	30,000	.000975	.000175			
7,812	31,000	.001025	.000050			
8,064	32,000	.001050	.000025			
8,316	33,000	.001075	.000025			
8,568	34,000	.001125	.000050			
8,820	35,000	.001150	.000025			
9,072	36,000	.001200	.000050			
9,324	37,000	.001225	.000025			
9,576	38,000	.001275	.000050			
9,828	39,000	.001300	.000025			
10,080	40,000	.001350	.000050			Elastic limit.
10,332	41,000	.006250	.004900			
10,584	42,000	.016750	.010500			
11,088	44,000	.019700	.002950			
11,592	46,000	.022625	.002925			
12,096	48,000	.025500	.002875			
12,600	50,000	.029625	.004125			
13,104	52,000	.033750	.004125			
13,608	54,000	.038125	.004375			
14,112	56,000	.043625	.005500			
14,616	58,000	.0500	.006375			
15,120	60,000	.0550	.0050			
15,624	62,000	.0675	.0125			
16,128	64,000	.0775	.0100			
16,632	66,000	.0925	.0150			
17,136	68,000	.1150	.0225			
17,640	70,000	.1550	.0400			
17,700	70,240					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	70,240
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.1925
Elongation per inch under strain at elastic limit	do...	.001350
Reduction in diameter at point of rupture	do...	.107
Reduction in area after rupture, per centum of original section		34.1
Position of rupture		1".7 from neck
Character of broken surface		silky
Elongation of inch sections		".16, ".16, ".27*, ".18

No. 4312.

Marks, $^{10}\ {}^{W}_{T,M}\ R_1\ C_6$
Diameter, ″.567.
Sectional area, .252 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
252	1,000	0.	0.	0.	0.	Initial load.
1,260	5,000	.000125	.000125	0.	.....	
2,520	10,000	.000300	.000175	.....	.....	
3,780	15,000	.000450	.000150	.....	.....	
5,040	20,000	.000625	.000175	0.	.....	
6,300	25,000	.000800	.000175	.....	.....	
7,560	30,000	.000975	.000175	.....	.....	
7,812	31,000	.001000	.000025	.....	.....	
8,064	32,000	.001025	.000025	.....	.....	
8,316	33,000	.001075	.000050	.....	.....	
8,568	34,000	.001125	.000050	.....	.....	
8,820	35,000	.001175	.000050	.....	.....	
9,072	36,000	.001225	.000050	.....	.....	
9,324	37,000	.001250	.000025	.....	.....	
9,576	38,000	.001300	.000050	.....	.....	
9,828	39,000	.001375	.000075	.....	.....	Elastic limit.
10,080	40,000	.008200	.006825	.....	.....	
10,332	41,000	.010000	.001800	.....	.....	
10,584	42,000	.019700	.009700	.....	.....	
11,088	44,000	.022200	.002500	.....	.....	
11,592	46,000	.025750	.003550	.....	.....	
12,096	48,000	.029450	.003700	.....	.....	
12,600	50,000	.033750	.004300	.....	.....	
13,104	52,000	.037375	.003625	.....	.....	
13,608	54,000	.043000	.005625	.....	.....	
14,112	56,000	.0475	.0045	.....	.....	
14,616	58,000	.0575	.0100	.....	.....	
15,120	60,000	.0700	.0125	.....	.....	
15,460	61,350	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	61,350
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.1060
Elongation per inch under strain at elastic limit	do...	.001375
Reduction in diameter at point of rupture	do...	.097
Reduction in area after rupture, per centum of original section		31.0
Position of rupture		″.75 from neck
Character of broken surface.....silky; specimen tore apart, fracture beginning at a dull yellowish spot at circumference.		
Elongation of inch sections		″.17*, ″.08, ″.08, ″.07

TABULATION OF TENSION SPECIMENS FROM 10-INCH WIRE-WOUND RIFLE.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength, per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Per cent.*	*Per cent.*		
3958	Tube	Inside	38,000	85,680	20.5	47.2	Silky	Manufactured by Schneider & Co., Creusot, France.
3959	do	Outside	48,000	89,840	21.0	49.7	do	
3960	do	Middle	38,000	82,040	22.3	49.7	do	
3961	do	Inside	37,000	84,640	19.3	47.2	do	
3962	do	Outside	45,000	85,920	20.3	52.2	do	
3963	do	Middle	37,000	81,920	21.0	49.7	do	
3964	do	Inside	45,000	89,960	12.8	36.4	Silky, slighty granular	
3965	do	Outside	46,000	88,280	20.0	52.2	Silky	
3966	do	Middle	47,000	90,440	16.5	30.6	Granular, 60 per cent.; silky, 40 per cent	
3967	do	Inside	44,000	87,960	20.0	36.4	Silky oblique	
3968	do	Outside	47,000	86,880	21.5	49.7	Silky	
3969	do	Middle	45,000	86,800	21.8	54.6	do	
4217	Jacket	Outside	52,000	87,760	8.7	5.0	Granular, dark spongy spot	Manufactured by the Standard Steel Casting Co., Thurlow, Pa.
4218	do	Inside	49,000	91,840	7.3	18.3	Granular, 50 per cent.; dull silky, 50 per cent	
4219	do	Middle	46,000	74,720	3.0	5.0	Granular, and dark spongy	
4220	do	do	42,000	64,000	6.0	15.0	Dull silky, and dark spongy	
4221	do	Inside	51,000	92,480	16.7	41.9	Silky	
4222	do	Outside	48,000	88,000	10.3	27.6	Granular, 50 per cent.; dull flaky, 50 per cent	
4223	do	Inside	48,000	81,870	19.0	46.3	Silky	
4224	do	Middle	49,000	87,680	12.0	41.9	do	
4225	do	Inside	51,000	91,120	8.7	18.3	Granular flaky, 70 per cent; dull smooth, 30 per cent	
4302	Hoop C_3	do	28,000	66,030	27.0	42.4	Granular, 50 per cent.; silky, 50 per cent	
4303	do	Outside	27,000	65,360	18.0	28.2	Granular, with dull spot	
4304	Hoop C_4	Middle	37,000	70,190	26.5	47.6	Fine silky	
4305	do	Inside	38,000	71,040	25.3	47.2	Silky oblique	
4306	do	Outside	39,000	78,610	17.3	28.2	Fine granular, 60 per cent.; silky serrated, 40 per cent.	
4307	Hoop C_5	Middle	37,000	61,110	11.5	22.2	Silky	
4308	do	do	40,000	61,710	17.0	36.9	do	
4309	do	do	39,000	64,560	15.0	28.2	do	
4310	Hoop C_6	do	39,000	68,000	20.5	31.0	Silky oblique	
4311	do	do	40,000	70,240	19.3	34.1	do	
4312	do	do	39,000	61,350	10.0	31.0	do	
3994	Ring A	Outside	57,000	111,280	9.0	18.3	Granular	
3995	do	Inside	54,000	108,160	11.8	21.4	do	
3996	do	Middle	53,000	106,080	11.3	21.4	do	

TABULATION OF COMPRESSION SPECIMENS FROM TUBE FOR 10-INCH WIRE-WOUND RIFLE.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch	Ultimate strength per square inch.	Manner of failure.	Remarks.
			Pounds.	*Pounds.*		
814	Tube	Inside	40,000	76,100	Triple flexure	Manufactured by Schneider & Co., Creusot, France.
815	....do	Outside	41,000	79,040	....do	
816	....do	Radial	41,000	89,900	....do	
817	....do	....do	29,000	86,800	....do	
818	... do	Inside	46,000	81,880	....do	
819	....do	Outside	48,000	77,420	....do	
820	....do	Radial	45,000	102,200	....do	

12-INCH B. L. RIFLE, NO. 1.

PECIMENS FROM TUBE, JACKET, HOOPS, GAS CHECK, AND BREECH BUSHING.

SPECIMENS FROM TUBE.

BREECH END.

No. 3887.

rks, 12 E T / B T, I
ımeter, ".564.
tional area, .25 square inch.
ıged length, 4".

pplied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
d.	Per square inch.					
	Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	1,000	0.	0.	0.	0.	Initial load.
0	5,000	.000125	.000125	0.		
0	10,000	.000300	.000175			
0	20,000	.000650	.000350	0.		
0	25,000	.000800	.000150			
0	30,000	.001025	.000225	.000025	.000025	
0	35,000	.001250	.000225	.000050	.000025	
0	36,000	.001275	.000050			
0	37,000	.001300	.000025			
0	38,000	.001375	.000075			
0	39,000	.001450	.000075			
0	40,000	.001500	.000050	.000225	.000175	Elastic limit.
0	41,000	.001625	.000125			
0	42,000	.001825	.000200			
0	43,000	.002000	.000175			
0	44,000	.002300	.000300			
0	45,000	.002650	.000350			
0	46,000	.003375	.000725			
0	48,000	.004900	.001525			
0	50,000	.007250	.002350			
0	52,000	.009700	.002450			
0	54,000	.012000	.002300			
0	56,000	.014750	.002750			
0	58,000	.017450	.002700			
0	60,000	.020250	.002800			
0	62,000	.023375	.003125			
0	64,000	.026875	.003500			
0	66,000	.030500	.003625			
0	68,000	.035000	.004500			
0	70,000	.040375	.005375			
0	72,000	.0500	.009625			
0	74,000	.0550	.0050			
0	76,000	.0650	.0100			
0	78,000	.0825	.0175			
0	79,240	.1150	.0325			Tensile strength.
						At time of rupture.

General summary.

ıgth per square inch of original section	pounds..	79,240
per square inch of original section	do...	40,000
er inch after rupture	inch.	.1425
er inch under strain at elastic limit	do...	.001500
diameter at point of rupture	do...	.114
area after rupture, per centum of original section		36.4

upture ".25 from neck
broken surface....dull silky, oblique, contains numerous parallel lines of bright luster early normal to the axis of the specimen. These lines appear to result from the separa- metal at cylindrical cavities ".01 diameter by ".04 to ".08 long.
leveloped in surface of stem.
f inch sections ".10, ".08, ".09, ".30"

No. 3888.

Marks, $\frac{12\ R\ T}{B\ T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000600	.000300	0.	.....	
6,250	25,000	.000775	.000175	.....	.....	
7,500	30,000	.000975	.000200	0.	.....	
7,750	31,000	.001000	.000025	.....	.....	
8,000	32,000	.001025	.000025	.....	.....	
8,250	33,000	.001050	.000025	.....	.....	
8,500	34,000	.001075	.000025	.....	.....	
8,750	35,000	.001100	.000025	0.	.....	
9,000	36,000	.001150	.000050	.....	.....	
9,250	37,000	.001175	.000025	.....	.....	
9,500	38,000	.001225	.000050	.....	.....	
9,750	39,000	.001250	.000025	.....	.....	
10,000	40,000	.001300	.000050	.000025	.000025	Elastic limit.
10,250	41,000	.001400	.000100	.....	.....	
10,500	42,000	.001500	.000100	.....	.....	
10,750	43,000	.002750	.001250	.....	.....	
11,000	44,000	.004200	.001450	.....	.....	
11,250	45,000	.005425	.001225	.....	.....	
11,500	46,000	.007075	.001650	.....	.....	
12,000	48,000	.009500	.002425	.....	.....	
12,500	50,000	.011275	.001775	.....	.....	
13,000	52,000	.013925	.002650	.....	.....	
13,500	54,000	.016250	.002325	.....	.....	
14,000	56,000	.018950	.002700	.....	.....	
14,500	58,000	.021875	.002925	.....	.....	
15,000	60,000	.025500	.003625	.....	.....	
15,500	62,000	.028500	.003000	.....	.....	
16,000	64,000	.032500	.004000	.....	.....	
16,500	66,000	.036875	.004375	.....	.....	
17,000	68,000	.041875	.005000	.....	.....	
17,500	70,000	.045950	.004075	.....	.....	
18,000	72,000	.0550	.009050	.....	.....	
18,500	74,000	.0625	.0075	.....	.....	
19,000	76,000	.0750	.0125	.....	.....	
19,500	78,000	.1000	.0250	.....	.....	
19,590	78,360	.1300	.1300	.....	.....	Tensile strength.
17,500	.....	.....	.....	.....	.....	At time of rupture.

General summary.

Tensile strength per square inch of original section.....pounds.. 7
Elastic limit per square inch of original section .....do... 4
Elongation per inch after rupture.....inch.. .
Elongation per inch under strain at elastic limit.....do... .0
Reduction in diameter at point of rupture .....do...
Reduction in area after rupture, per centum of original section.....
Position of rupture.....".60 from
Character of broken surface....silky, irregular, a few bright lines shown which were oblique to axis of the specimen. Opened cracks in the surface of stem.
Elongation of the inch sections.....", ".41", ".14,

No. 3889.

Marks, $\frac{12\ B\ T}{B\ T_1\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000275	.000125	.....	.....	
5,000	20,000	.000625	.000350	0.	.....	
6,250	25,000	.000800	.000175	.....	.....	
7,500	30,000	.001000	.000200	.000025	.000025	
7,750	31,000	.001025	.000025	.....	.....	
8,000	32,000	.001075	.000050	.....	.....	Elastic limit.
8,250	33,000	.001175	.000100	.....	.....	
8,500	34,000	.001275	.000100	.....	.....	
8,750	35,000	.001525	.000250	.000475	.000450	
9,000	36,000	.002500	.000975	.....	.....	
9,250	37,000	.003025	.000525	.....	.....	
9,500	38,000	.003875	.000850	.....	.....	
9,750	39,000	.004800	.000925	.....	.....	
10,000	40,000	.006275	.001475	.004800	.004325	
10,500	42,000	.008250	.001975	.....	.....	
11,000	44,000	.010500	.002250	.....	.....	
11,500	46,000	.013250	.002750	.....	.....	
12,000	48,000	.016125	.002875	.....	.....	
12,500	50,000	.019400	.003275	.....	.....	
13,000	52,000	.022750	.003350	.....	.....	
13,500	54,000	.026375	.003625	.....	.....	
14,000	56,000	.031000	.004625	.....	.....	
14,500	58,000	.035625	.004625	.....	.....	
15,000	60,000	.041500	.005875	.....	.....	
15,500	62,000	.048375	.006875	.....	.....	
16,000	64,000	.0575	.009125	.....	.....	
16,500	66,000	.0700	.0125	.....	.....	
17,000	68,000	.0850	.0150	.....	.....	
17,500	70,000	.1175	.0325	.....	.....	
17,820	71,280	.1950	.0775	.....	.....	Tensile strength.
15,100	.....	.....	.....	.....	.....	At time of rupture.

General summary.

...ile strength per square inch of original section	pounds..	71,280
...tic limit per square inch of original section	do...	32,000
...gation per inch after rupture	inch..	.2500
...gation per inch under strain at elastic limit	do...	.001075
...duction in diameter at point of rupture	do...	.154
...uction in area after rupture, per centum of original section		47.2
...ition of rupture		1" 50 from neck
...racter of broken surface, resembles that of B T_1 I, except bright lines are oblique to axis of specimen.		
...gation of inch sections		".21, ".43, * ".20, ".16

No. 3890.

Marks, $\frac{12\ R\ T}{B\ T,\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000250	.000175	.....	.....	
5,000	20,000	.000550	.000300	0.	.....	
6,250	25,000	.000750	.000200	.....	.....	
7,500	30,000	.000975	.000225	0.	.....	
7,750	31,000	.001000	.000025	.....	.....	
8,000	32,000	.001025	.000025	.....	.....	
8,250	33,000	.001050	.000050	.....	.....	
8,500	34,000	.001100	.000050	.....	.....	
8,750	35,000	.001150	.000050	.000050	.000050	
9,000	36,000	.001200	.000050	.....	.....	
9,250	37,000	.001250	.000050	.....	.....	
9,500	38,000	.001300	.000050	.....	.....	Elastic limit.
9,750	39,000	.001400	.000100	.....	.....	
10,000	40,000	.001525	.000125	.000250	.000200	
10,250	41,000	.001675	.000150	.....	.....	
10,500	42,000	.001775	.000100	.....	.....	
10,750	43,000	.001950	.000175	.....	.....	
11,000	44,000	.002275	.000325	.....	.....	
11,250	45,000	.002725	.000450	.....	.....	
11,500	46,000	.003675	.000950	.....	.....	
12,000	48,000	.005500	.001825	.....	.....	
12,500	50,000	.008125	.002625	.....	.....	
13,000	52,000	.011000	.002875	.....	.....	
13,500	54,000	.013125	.002125	.....	.....	
14,000	56,000	.015775	.002650	.....	.....	
14,500	58,000	.018750	.002975	.....	.....	
15,000	60,000	.021875	.003125	.....	.....	
15,500	62,000	.025000	.003125	.....	.....	
16,000	64,000	.028750	.003750	.....	.....	
16,500	66,000	.033250	.004500	.....	.....	
17,000	68,000	.0375	.004250	.....	.....	
17,500	70,000	.0437	.0062	.....	.....	
18,000	72,000	.0505	.0068	.....	.....	
18,500	74,000	.0625	.0120	.....	.....	
19,000	76,000	.0750	.0125	.....	.....	
19,500	78,000	.1025	.0275	.....	.....	Tensile strength.
17,300	.....	.....	.....	.....	.....	At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	78,000
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.1525
Elongation per inch under strain at elastic limit	do...	.001360
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		".35 from neck
Character of broken surface		resembles that of B T, O
Elongation of inch sections		".30*, ".10, ".09, ".12

No. 3891.

Marks, 12 R T / B T, O
Diameter, .7564
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
al.	Per square inch.					
lb.	Pounds.	Inch.	Inch.	Inch.	Inch.	
0	1, 000	0.	0.	0.	0.	Initial load.
0	5, 000	.000125	.000125	0.		
0	10, 000	.000300	.000175			
0	20, 000	.000625	.000325	0.		
	25, 000	.000800	.000175			
	30, 000	.000950	.000150	0.		
	31, 000	.000975	.000025			
	32, 000	.001025	.000050			
	33, 000	.001075	.000050			
	34, 000	.001100	.000025			
	35, 000	.001125	.000025	.000050	.000050	
	36, 000	.001150	.000025			
	37, 000	.001175	.000025			Elastic limit.
	38, 000	.001250	.000075			
	39, 000	.001350	.000100			
	40, 000	.001425	.000075			
	41, 000	.003300	.001875			
	42, 000	.005250	.001950			
	43, 000	.006175	.000925			
	44, 000	.007325	.001150			
	46, 000	.009550	.002225			
	48, 000	.012000	.002450			
	50, 000	.014250	.002250			
	52, 000	.016875	.002625			
	54, 000	.019375	.002500			
	56, 000	.022600	.003225			
	58, 000	.026000	.003400			
	60, 000	.029375	.003375			
	62, 000	.033500	.004125			
	64, 000	.038000	.004500			
	66, 000	.043000	.005000			
	68, 000	.049625	.006625			
	70, 000	.0550	.005375			
	72, 000	.0700	.0150			
	74, 000	.0850	.0150			
	76, 000	.1075	.0225			
	77, 120	.1650	.0575			Tensile strength.
						At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	77, 120
Elastic limit per square inch of original section	do...	37, 000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do....	.001175
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		2".10 from neck
Character of broken surface granular, 40 per cent.; silky, 60 per cent.; opened cracks in surface of stem		
Diameters of inch sections		".15 ".42 ".18 ".13

No. 3892.

Marks, $\frac{12\ R\ T}{B\ T_c\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Elastic limit
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000575	.000300	0.	.....	
6,250	25,000	.000750	.000175	.....	.....	
7,500	30,000	.000975	.000225	0.	.....	
7,750	31,000	.001000	.000025	.....	.....	
8,000	32,000	.001050	.000050	.....	.....	Elastic limit.
8,250	33,000	.001175	.000125	.....	.....	
8,500	34,000	.001300	.000125	.....	.....	
8,750	35,000	.001775	.000475	.....	.....	
9,000	36,000	.002825	.001050	.....	.....	
9,250	37,000	.003400	.000575	.....	.....	
9,500	38,000	.004425	.001025	.....	.....	
9,750	39,000	.005500	.001075	.....	.....	
10,000	40,000	.006675	.001175	.....	.....	
10,500	42,000	.008950	.002275	.....	.....	
11,000	44,000	.011500	.002550	.....	.....	
11,500	46,000	.014250	.002750	.....	.....	
12,000	48,000	.017125	.002875	.....	.....	
12,500	50,000	.020750	.003625	.....	.....	
13,000	52,000	.024250	.003500	.....	.....	
13,500	54,000	.028375	.004125	.....	.....	
14,000	56,000	.033000	.004625	.....	.....	
14,500	58,000	.038500	.005500	.....	.....	
15,000	60,000	.044575	.006075	.....	.....	
15,500	62,000	.0500	.005425	.....	.....	
16,000	64,000	.0600	.0100	.....	.....	
16,500	66,000	.0750	.0150	.....	.....	
17,000	68,000	.1000	.0250	.....	.....	
17,500	70,000	.1750	.0750	.....	.....	Tensile strength.
15,500	.....	.....	.....	.....	.....	At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	70,000
Elastic limit per square inch of original section	do...	32,000
Elongation per inch after rupture	inch..	.2790
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1".45 from neck
Character of broken surface		silky oblique; bright lines parallel to surface of fracture
Elongation of inch sections		".18, ".24, ".43*, ".23

No. 797.

Marks, $\frac{12\ R\ T}{B\ R,}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000100	.000100	.....	.....	
5, 000	10, 000	.000300	.000200	.....	.....	
7, 500	15, 000	.000433	.000133	.....	.....	
10, 000	20, 000	.000567	.000134	0.	.....	
12, 500	25, 000	.000733	.000166	.....	.....	
15, 000	30, 000	.000933	.000200	0.	.....	
17, 500	35, 000	.001133	.000200	.000033	.000033	Elastic limit.
18, 500	36, 000	.001333	.000200	.....	.....	
19, 500	37, 000	.001500	.000167	.....	.....	
19, 000	38, 000	.001733	.000233	.....	.....	
19, 500	39, 000	.002467	.000734	.....	.....	
20, 000	40, 000	.004667	.002200	.003267	.003234	
20, 500	41, 000	.005500	.000833	.....	.....	
21, 000	42, 000	.006267	.000767	.....	.....	
21, 500	43, 000	.007067	.000800	.....	.....	
22, 000	44, 000	.008067	.001000	.....	.....	
22, 500	45, 000	.009200	.001133	.....	.....	Ultimate strength.
34, 780	69, 560	.....	.....	.....	.....	

Failed by triple flexure.

No. 798.

Marks, $\frac{12\ B\ T}{B\ R_3}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Sucessive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000267	.000134	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000567	.000134	0.	.....	
12,500	25,000	.000733	.000166	.....	.....	
15,000	30,000	.000900	.000167	0.	.....	
15,500	31,000	.000933	.000033	.....	.....	
16,000	32,000	.000967	.000037	.....	.....	
16,500	33,000	.001000	.000033	.....	.....	
17,000	34,000	.001067	.000067	.....	.....	Elastic limit.
17,500	35,000	.001167	.000100	.000167	.000167	
18,000	36,000	.001300	.000133	.....	.....	
18,500	37,000	.001533	.000233	.....	.....	
19,000	38,000	.002000	.000467	.....	.....	
19,500	39,000	.002900	.000900	.....	.....	
20,000	40,000	.005000	.002100	.003600	.003433	
20,500	41,000	.005567	.000567	.....	.....	
21,000	42,000	.006467	.000900	.....	.....	
21,500	43,000	.007467	.001000	.....	.....	
22,000	44,000	.008700	.001233	.....	.....	
22,500	45,000	.009833	.001133	.008233	.004633	
34,270	68,540	.....	.....	.....	.....	Ultimate strength.

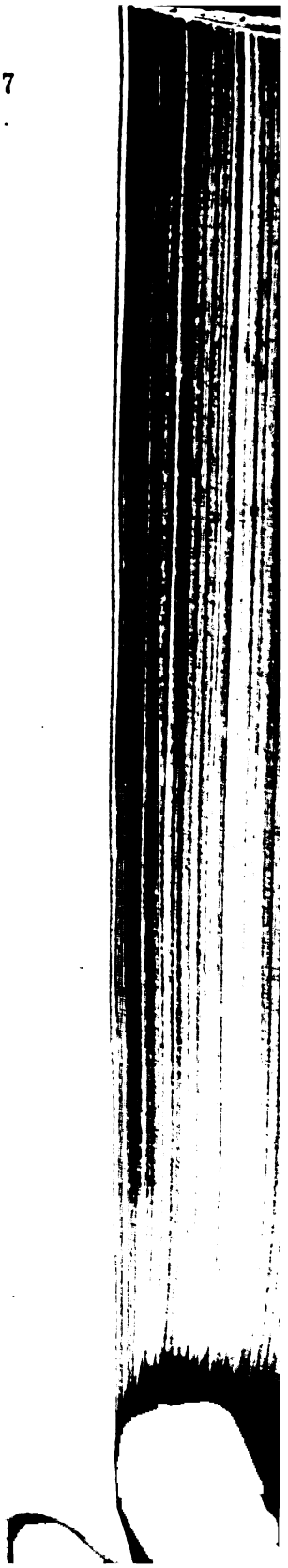
Failed by triple flexure.

No. 795.

Marks, $\frac{12\ R\ T}{B\ T,\ I}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.00011	.00011	.....	.....	
10,000	10,000	.00029	.00018	.....	.....	
15,000	15,000	.00045	.00016	.....	.....	
20,000	20,000	.00061	.00016	0.	.....	
25,000	25,000	.00080	.00019	.....	.....	
28,000	28,000	.00090	.00010	.....	.....	
29,000	29,000	.00093	.00003	.....	.....	
30,000	30,000	.00098	.00005	.00003	.00003	
31,000	31,000	.00101	.00003	.....	.....	Elastic limit.
32,000	32,000	.00107	.00006	.....	.....	
33,000	33,000	.00112	.00005	.....	.....	
34,000	34,000	.00130	.00018	.....	.....	
35,000	35,000	.00135	.00005	.00022	.00019	
36,000	36,000	.00151	.00016	.....	.....	
37,000	37,000	.00170	.00019	.....	.....	
38,000	38,000	.00191	.00021	.....	.....	
39,000	39,000	.00224	.00033	.....	.....	
40,000	40,000	.00271	.00047	.00142	.00120	
41,000	41,000	.00321	.00050	.....	.....	
42,000	42,000	.00450	.00129	.....	.....	
43,000	43,000	.00550	.00100	.....	.....	
44,000	44,000	.00725	.00175	.....	.....	
44,200	44,200	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.



No. 796.

Marks, $\frac{12\ R\ T}{B\ T_{10}\ O}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
5,000	5,000	.00011	.00011	.....	.....	
10,000	10,000	.00029	.00018	.....	.....	
15,000	15,000	.00044	.00015	.....	.....	
20,000	20,000	.00061	.00017	0.	.....	
25,000	25,000	.00080	.00019	.....	.....	
28,000	28,000	.00091	.00011	.....	.....	
29,000	29,000	.00093	.00002	.....	.....	
30,000	30,000	.00099	.00006	.00002	.00002	
31,000	31,000	.00102	.00003	.....	.....	
32,000	32,000	.00108	.00006	.....	.....	
33,000	33,000	.00111	.00003	.....	.....	Elastic limit.
34,000	34,000	.00119	.00008	.....	.....	
35,000	35,000	.00128	.00009	.00017	.00015	
36,000	36,000	.00165	.00037	.....	.....	
37,000	37,000	.00201	.00036	.....	.....	
38,000	38,000	.00240	.00039	.....	.....	
39,000	39,000	.00300	.00060	.....	.....	
40,000	40,000	.00410	.00110	.00271	.00254	
46,470	46,470	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 800.

Marks, $\frac{12\ R\ T}{B\ T_{12}\ O}$
Length, ″5.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000233	.000133	.....	.....	
7,500	15,000	.000400	.000167	.....	.....	
10,000	20,000	.000533	.000133	0.	.....	
12,500	25,000	.000733	.000200	.....	.....	
15,000	30,000	.000933	.000200	.000033	.000033	
15,500	31,000	.000967	.000034	.....	.....	
16,000	32,000	.001000	.000033	.....	.....	
16,500	33,000	.001033	.000033	.....	.....	
17,000	34,000	.001100	.000067	.....	.....	Elastic limit.
17,500	35,000	.001200	.000100	.000133	.000100	
18,000	36,000	.001333	.000133	.....	.....	
18,500	37,000	.001500	.000167	.....	.....	
19,000	38,000	.001800	.000300	.....	.....	
19,500	39,000	.002533	.000733	.....	.....	
20,000	40,000	.003367	.000834	.001500	.000167	
20,500	41,000	.004000	.000633	.....	.....	
21,000	42,000	.004933	.000933	.....	.....	
21,500	43,000	.006200	.001267	.....	.....	
22,000	44,000	.007333	.001133	.....	.....	
22,500	45,000	.008600	.001267	.006800	.005300	
35,480	70,960	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

MUZZLE END.

No. 3893.

Marks, $\frac{12\ R\ T}{M\ T,\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000600	.000323	0.	.....	
6,250	25,000	.000775	.000175	.....	.....	
7,500	30,000	.000975	.000200	0.	.....	
8,750	35,000	.001175	.000200	0.	.....	
9,000	36,000	.001200	.000025	.....	.....	
9,250	37,000	.001250	.000025	.....	.....	
9,500	38,000	.001275	.000050	.....	.....	
9,750	39,000	.001300	.000025	.....	.....	
10,000	40,000	.001350	.000050	0.	.....	
10,250	41,000	.001400	.000050	.....	.....	
10,500	42,000	.001425	.000025	.....	.....	
10,750	43,000	.001475	.000050	.....	.....	
11,000	44,000	.001500	.000025	.....	.....	
11,250	45,000	.001525	.000025	0.	.....	Elastic limit.
11,500	46,000	.002550	.001025	.....	.....	
11,750	47,000	.003500	.000950	.....	.....	
12,000	48,000	.005200	.001700	.....	.....	
12,250	49,000	.006250	.001050	.....	.....	
12,500	50,000	.007750	.000300	.....	.....	
13,000	52,000	.008250	.001500	.....	.....	
13,500	54,000	.010125	.001875	.....	.....	
14,000	56,000	.012875	.001750	.....	.....	
14,500	58,000	.013750	.001875	.....	.....	
15,000	60,000	.015625	.001875	.....	.....	
15,500	62,000	.017500	.001875	.....	.....	
16,000	64,000	.019750	.002250	.....	.....	
16,500	66,000	.022375	.002625	.....	.....	
17,000	68,000	.024875	.002500	.....	.....	
17,500	70,000	.027425	.002550	.....	.....	
18,000	72,000	.031000	.003575	.....	.....	
18,500	74,000	.034000	.003000	.....	.....	
19,000	76,000	.038125	.004125	.....	.....	
19,500	78,000	.0425	.004375	.....	.....	
20,000	80,000	.0475	.0050	.....	.....	
20,500	82,000	.0525	.0050	.....	.....	
21,000	84,000	.0650	.0125	.....	.....	
21,500	86,000	.0750	.0100	.....	.....	
22,000	88,000	.0900	.0150	.....	.....	
22,500	90,000	.1325	.0425	.....	.....	Tensile strength.
20,800	.....	.....	.....	.....	.....	At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	90,000
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001525
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1".60 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".11, ".13, ".31*, ".13

No. 3894.

Marks, $\frac{12\ R\ T}{M\ T, O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000575	.000300	0.	.....	
7,500	30,000	.000950	.000375	0.	.....	
8,750	35,000	.001100	.000150	0.	.....	
10,000	40,000	.001250	.000150	0.	.....	
10,250	41,000	.001275	.000025	.....	.....	
10,500	42,000	.001325	.000050	.....	.....	
10,750	43,000	.001350	.000025	.....	.....	
11,000	44,000	.001425	.000075	.....	.....	
11,250	45,000	.001475	.000050	0.	.....	Elastic limit.
11,500	46,000	.002250	.000775	.....	.....	
11,750	47,000	.002450	.000200	.....	.....	
12,000	48,000	.003700	.001250	.....	.....	
12,250	49,000	.004950	.001250	.....	.....	
12,500	50,000	.006000	.001050	.....	.....	
13,000	52,000	.007500	.001500	.....	.....	
13,500	54,000	.009125	.001625	.....	.....	
14,000	56,000	.011000	.001875	.....	.....	
14,500	58,000	.013125	.002125	.....	.....	
15,000	60,000	.015000	.001875	.....	.....	
15,500	62,000	.017000	.002000	.....	.....	
16,000	64,000	.019375	.002375	.....	.....	
16,500	66,000	.022250	.002875	.....	.....	
17,000	68,000	.024625	.002375	.....	.....	
17,500	70,000	.028000	.003375	.....	.....	
18,000	72,000	.031000.	.003000	.....	.....	
18,500	74,000	.034375	.003375	.....	.....	
19,000	76,000	.038375	.004000	.....	.....	
19,500	78,000	.043000	.004625	.....	.....	
20,000	80,000	.0475	.0045	.....	.....	
20,500	82,000	.0525	.0050	.....	.....	
21,000	84,000	.0625	.0100	.....	.....	
21,500	86,000	.0775	.0150	.....	.....	
22,000	88,000	.0975	.0200	.....	.....	
22,180	88,720	.1350	.0375	.....	.....	Tensile strength.
18,900	.....	.....	.....	.....	.....	At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	88,720
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.1750
Elongation per inch under strain at elastic limit	do...	.001475
Reduction in diameter at point of rupture	do...	.188
Reduction in area after rupture, per centum of original section		67.3
Position of rupture		".85 from neck
Character of broken surface		silky
Elongation of inch sections		".08, ".11, ".14, ".31

No. 3895.

Marks, $\frac{12\ E\ T}{M\ T,\ M}$
Diameter, $\prime\prime.564$.
Sectional area, .25 square inch.
Gauged length, $4''$.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	.....	0.	0.	Initial load.
1,250	5,000	.000100	.....	.....	.....	
2,500	10,000	.000275	.....	.....	.....	
5,000	20,000	.000575	.....	.....	.....	
7,500	30,000	.000950	.....	.....	.....	
8,750	35,000	.001100	.....	.....	.....	
9,000	40,000	.001300	.....	.....	.....	
9,250	41,000	.001325	.....	.....	.....	
9,500	42,000	.001350	.....	.....	.....	
9,750	43,000	.001400	.....	.....	.....	
10,000	44,000	.001450	.....	.....	.....	
10,250	45,000	.001475	.....	.....	.....	
10,500	46,000	.001525	.....	.....	.....	Elastic limit.
		.002250	.....	.....	.....	
10,750	47,000	.003500	.001250	.....	.....	
11,000	48,000	.005450	.001950	.....	.....	
11,250	49,000	.006150	.000700	.....	.....	
11,500	50,000	.006975	.000825	.....	.....	
11,750	52,000	.008500	.001525	.....	.....	
12,000	54,000	.010000	.001500	.....	.....	
12,250	56,000	.011875	.001875	.....	.....	
12,500	58,000	.014400	.002525	.....	.....	
12,750	60,000	.015950	.001550	.....	.....	
13,000	62,000	.018000	.002050	.....	.....	
13,250	64,000	.020625	.002625	.....	.....	
13,500	66,000	.023000	.002375	.....	.....	
13,750	68,000	.025950	.002950	.....	.....	
14,000	70,000	.028775	.002825	.....	.....	
14,250	72,000	.032000	.003225	.....	.....	
14,500	74,000	.036000	.004000	.....	.....	
14,750	76,000	.040000	.004000	.....	.....	
15,000	78,000	.043750	.003750	.....	.....	
15,250	80,000	.0500	.006250	.....	.....	
15,500	82,000	.0575	.0075	.....	.....	
15,750	84,000	.0675	.0100	.....	.....	
16,000	86,000	.0800	.0125	.....	.....	
16,250	88,000	.1050	.0250	.....	.....	Tensile strength.
16,100	88,400	.1275	.0225	.....	.....	At time of fracture.
16,000	.....	.....	.....	.....	.....	

General summary.

Ultimate strength per square inch of original section	pounds..	88,400
Load per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	0.1725
Elongation per inch under strain at elastic limit	do...	.001525
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Location of rupture		″.110 from neck
Character of rupture		silky; oblique
Character of broken surface		
Diameters of inch sections		″.09, ″.11, ″.22, ″.27*

No. 3896.

Marks, $\frac{12\ R\ T}{M\ T_4\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000275	.000200	.....	.....	
5,000	20,000	.000575	.000300	0.	.....	
7,500	30,000	.000925	.000350	0.	.....	
8,750	35,000	.001075	.000150	0.	.....	
10,000	40,000	.001275	.000200	0.	.....	
10,250	41,000	.001300	.000025	.....	.....	
10,500	42,000	.001325	.000025	.....	.....	
10,750	43,000	.000375	.000050	.....	.....	
11,000	44,000	.001400	.000025	.....	.....	
11,250	45,000	.001450	.000050	.....	.....	
11,500	46,000	.001500	.000050	.....	.....	
11,750	47,000	.001575	.000075	.....	.....	
12,000	48,000	.001600	.000025	.....	.....	Elastic limit.
12,250	49,000	.005250	.003650	.....	.....	
12,500	50,000	.005625	.000375	.....	.....	
12,750	51,000	.006225	.000600	.....	.....	
13,000	52,000	.006975	.000750	.....	.....	
13,250	53,000	.007500	.000525	.....	.....	
13,500	54,000	.008450	.000950	.....	.....	
14,000	56,000	.010250	.001800	.....	.....	
14,500	58,000	.012000	.001750	.....	.....	
15,000	60,000	.013925	.001925	.....	.....	
15,500	62,000	.015625	.001700	.....	.....	
16,000	64,000	.017925	.002300	.....	.....	
16,500	66,000	.020000	.002075	.....	.....	
17,000	68,000	.022500	.002500	.....	.....	
17,500	70,000	.025000	.002500	.....	.....	
18,000	72,000	.027500	.002500	.....	.....	
18,500	74,000	.030500	.003000	.....	.....	
19,000	76,000	.033950	.003450	.....	.....	
19,500	78,000	.037625	.003675	.....	.....	
20,000	80,000	.041500	.003875	.....	.....	
20,500	82,000	.0475	.0060	.....	.....	
21,000	84,000	.0500	.0025	.....	.....	
21,500	86,000	.0575	.0075	.....	.....	
22,000	88,000	.0700	.0125	.....	.....	
22,500	90,000	.0875	.0175	.....	.....	
23,000	92,000	.1250	.0375	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section.....pounds.. 92,0
Elastic limit per square inch of original section.....do... 48,0
Elongation per inch after rupture.....inch.. .1
Elongation per inch under strain at elastic limit.....do... .00
Reduction in diameter at point of rupture.....do... .0
Reduction in area after rupture, per centum of original section..... 2
Position of rupture.....1" from n
Character of broken surface.....granular, 60 per cent.; silky oblique, 40 per ce
Elongation of inch sections.....".12, ".11, ".16, ".2

No. 3897.

Marks, $\frac{12\ R\ T}{M\ T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200			
5,000	20,000	.000625	.000325	0.		
7,500	30,000	.000975	.000350	0.		
8,750	35,000	.001125	.000150	0.		
10,000	40,000	.001350	.000225	.000050	.000050	
10,250	41,000	.001375	.000025			
10,500	42,000	.001400	.000025			
10,750	43,000	.001425	.000025			
11,000	44,000	.001475	.000050			
11,250	45,000	.001500	.000025			
11,500	46,000	.001550	.000050			Elastic limit.
11,750	47,000	.002125	.000550			
12,000	48,000	.003750	.001625			
12,250	49,000	.004875	.001125			
12,500	50,000	.005950	.001075			
12,750	51,000	.007500	.001550			
13,000	52,000	.009250	.001750			
13,250	53,000	.011000	.001750			
13,500	54,000	.012925	.001925			
13,750	55,000	.014875	.001950			
14,000	56,000	.016950	.002075			
14,250	57,000	.019250	.002300			
14,500	58,000	.021625	.002375			
14,750	59,000	.024500	.002875			
15,000	60,000	.027025	.002525			
15,250	61,000	.030375	.003350			
15,500	62,000	.033650	.003275			
15,750	63,000	.0375	.003850			
16,000	64,000	.0425	.0050			
16,250	65,000	.0475	.0050			
16,500	66,000	.0525	.0050			
16,750	67,000	.0600	.0075			
17,000	68,000	.0725	.0125			
17,250	69,000	.0900	.0175			
17,500	70,000	.1300	.0400			Tensile strength.
17,750	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	90,000
Breaking load per square inch of original section	do ..	46,000
Elongation per inch after rupture	inch..	.1725
Elongation per inch under strain at elastic limit	do...	.001550
Contraction is diameter at point of rupture	do...	.094
Contraction is area after rupture, per centum of original section		30.6
Position of rupture		1".60 from neck
Character of broken surface		silky oblique
Thickness of inch sections		".18, ".28", ".13, "1

No. 3898

Marks, $\frac{12\ R\ T}{M\ T_4 M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	.0	Initial load.
1,250	5,000	.000125	.000125	0.		
2,500	10,000	.000325	.000200			
5,000	20,000	.000650	.000325	0.		
7,500	30,000	.001000	.000350	.000025	.000025	
8,750	35,000	.001175	.000175	.000050	.000025	
10,000	40,000	.001425	.000250	.000050	0.	
10,250	41,000	.001450	.000025			
10,500	42,000	.001475	.000025			
10,750	43,000	.001500	.000025			
11,000	44,000	.001525	.000025			
11,250	45,000	.001550	.000025			
11,500	46,000	.001600	.000050			
11,750	47,000	.001650	.000050			Elastic limit.
12,000	48,000	.002850	.000200			
12,250	49,000	.003250	.000400			
12,500	50,000	.004375	.001125			
13,000	52,000	.006225	.001850			
13,500	54,000	.007625	.001400			
14,000	56,000	.009500	.001875	.007300	.007250	
14,500	58,000	.010350	.000850			
15,000	60,000	.012675	.002325	.010250	.002950	
15,500	62,000	.014125	.001450			
16,000	64,000	.016300	.002175			
16,500	66,000	.018400	.002100			
17,000	68,000	.020750	.002350			
17,500	70,000	.023550	.002800			
18,000	72,000	.026000	.002450			
18,500	74,000	.028375	.002375			
19,000	76,000	.032000	.003625			
19,500	78,000	.0350	.0030			
20,000	80,000	.0400	.0050			
20,500	82,000	.0425	.0025			
21,000	84,000	.0475	.0050			
21,500	86,000	.0525	.0050			
22,000	88,000	.0625	.0100			
22,500	90,000	.0750	.0125			
22,980	91,920	.1000	.0250			Tensile strength.
22,100						At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	91,920
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch...	.1125
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		"50 from neck
Character of broken surface	granular, 40 per cent.; silky oblique, 60 per cent	
Elongation of inch sections	".23", ".09, ".07, ".06	

No. 801.

Marks, $\frac{12\ R\ T}{M\ T,\ I}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000100	.000100	.....	.....	
5, 000	10, 000	.000233	.000133	.....	.....	
7, 500	15, 000	.000400	.000167	.....	.....	
10, 000	20, 000	.000533	.000133	0.	.....	
12, 500	25, 000	.000700	.000167	.....	.....	
15, 000	30, 000	.000933	.000333	0.	.....	
17, 500	35, 000	.001100	.000167	.....	.....	
20, 000	40, 000	.001367	.000167	.000067	.000067	
20, 500	41, 000	.001333	.000066	.....	.....	
21, 000	42, 000	.001367	.000034	.....	.....	
21, 500	43, 000	.001267	0.	.....	.....	
22, 000	44, 000	.001433	.000066	.....	.....	
22, 500	45, 000	.001467	.000034	.....	.....	
23, 000	46, 000	.001500	.000033	.....	.....	
23, 500	47, 000	.001533	.000033	.....	.....	Elastic limit.
24, 000	48, 000	.002800	.001267	.....	.....	
24, 500	49, 000	.004500	.001700	.....	.....	
25, 000	50, 000	.004667	.000167	.....	.....	
25, 500	51, 000	.005033	.000366	.....	.....	
26, 000	52, 000	.005667	.000634	.....	.....	
26, 500	53, 000	.006267	.000600	.....	.....	
27, 000	54, 000	.006733	.000466	.....	.....	
27, 500	55, 000	.007400	.000667	.....	.....	
28, 000	56, 000	.007833	.000433	.....	.....	
41, 300	82, 600	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 802.

Marks, $\frac{12\ R\ T}{M\ T,\ O}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000267	.000134	.....	.....	
7,500	15,000	.000400	.000133	.....	.....	
10,000	20,000	.000567	.000167	0.	.....	
12,500	25,000	.000733	.000166	.....	.....	
15,000	30,000	.000900	.000167	0.	.....	
17,500	35,000	.001067	.000167	.....	.....	
20,000	40,000	.001233	.000166	0.	.....	
20,500	41,000	.001267	.000034	.....	.....	
21,000	42,000	.001333	.000066	.....	.....	
21,500	43,000	.001367	.000034	.....	.....	
22,000	44,000	.001400	.000033	.....	.....	
22,500	45,000	.001467	.000067	.....	.....	
23,000	46,000	.001533	.000066	.....	.....	
23,500	47,000	.001600	.000067	.....	.....	
24,000	48,000	.001667	.000067	.....	.....	
24,500	49,000	.001767	.000100	.....	.....	Elastic limit.
25,000	50,000	.001967	.000200	.....	.....	
25,500	51,000	.004300	.002333	.....	.....	
26,000	52,000	.005533	.001233	.....	.....	
26,500	53,000	.006600	.001067	.....	.....	
27,000	54,000	.007333	.000733	.....	.....	
42,410	84,820	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 803.

Marks, $\frac{12\ R\ T}{M\ R}$.
Length, 3″.80.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000233	.000133	.....	.....	
7,500	15,000	.000376	.000134	.....	.....	
10,000	20,000	.000500	.000133	0.	.....	
12,500	25,000	.000667	.000176	.....	.....	
15,000	30,000	.000933	.000266	0.	.....	
17,500	35,000	.001067	.000134	.....	.....	
20,000	40,000	.001233	.000166	0.	.....	
20,500	41,000	.001233	0.	.....	.....	
21,000	42,000	.001267	.000034	.....	.....	
21,500	43,000	.001300	.000033	.....	.....	Elastic limit.
22,000	44,000	.001333	.001033	.....	.....	
22,500	45,000	.002867	.000534	.....	.....	
23,000	46,000	.003400	.000533	.....	.....	
23,500	47,000	.004033	.000633	.....	.....	
24,000	48,000	.004633	.000600	.....	.....	
24,500	49,000	.005300	.000667	.....	.....	
25,000	50,000	.005900	.000600	.....	.....	Ultimate strength.
45,580	91,160	.....	.....	.....	.....	

Failed by double flexure.

SPECIMENS FROM JACKET.

REAR END.

No. 3903.

Marks, $\frac{12\ R\ J}{B\ T_1 I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

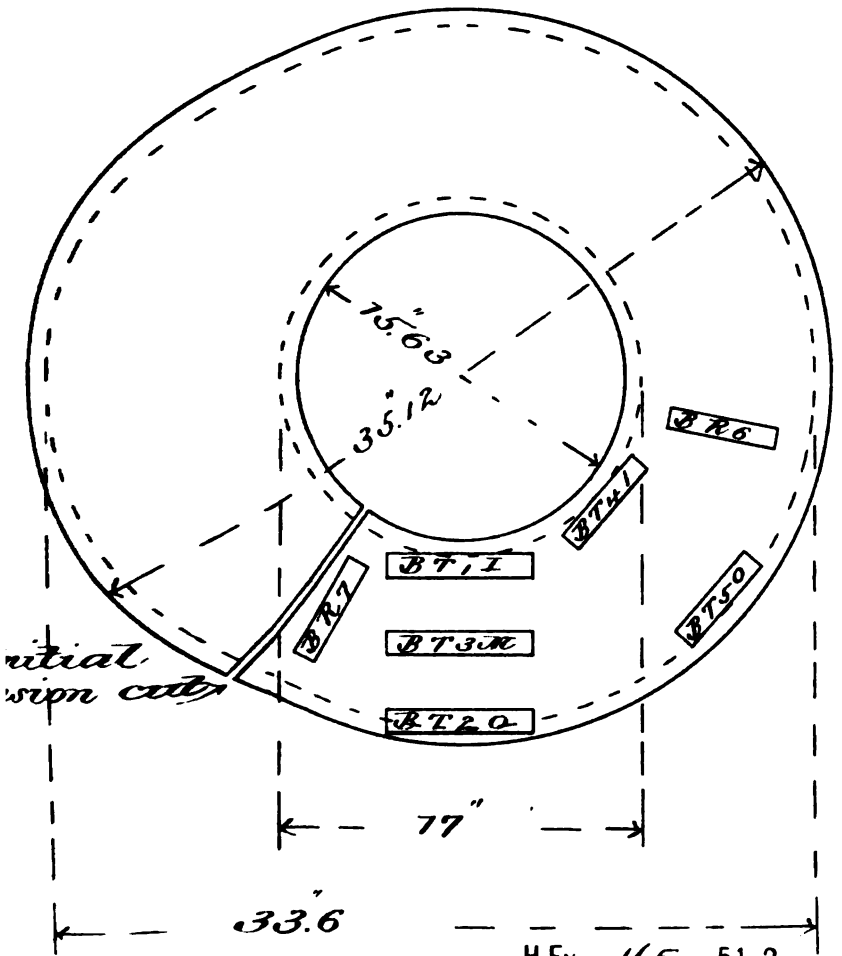
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000550	.000275	.....	.....	
7,500	30,000	.000925	.000375	.....	.....	
8,750	35,000	.001050	.000125	0.	.....	
9,500	38,000	.001125	.000075	.....	.....	
9,750	39,000	.001175	.000050	.....	.....	Elastic limit.
10,000	40,000	.002250	.001075	.000825	.000825	
10,250	41,000	.002475	.000225	.....	.....	
10,500	42,000	.002675	.000200	.001250	.000425	
10,750	43,000	.003000	.000325	.....	.....	
11,000	44,000	.003425	.000425	.....	.....	
11,250	45,000	.004000	.000575	.....	.....	
11,500	46,000	.004900	.000900	.....	.....	
12,000	48,000	.006425	.001525	.....	.....	
12,500	50,000	.008275	.001850	.....	.....	
13,000	52,000	.010300	.002025	.....	.....	
13,500	54,000	.012250	.001950	.....	.....	
14,000	56,000	.014450	.002200	.....	.....	
14,500	58,000	.016625	.002175	.....	.....	
15,000	60,000	.018925	.002300	.....	.....	
15,500	62,000	.021500	.002575	.....	.....	
16,000	64,000	.024125	.002625	.....	.....	
16,500	66,000	.027500	.003375	.....	.....	
17,000	68,000	.030500	.003000	.....	.....	
17,500	70,000	.034000	.003500	.....	.....	
18,000	72,000	.038500	.004500	.....	.....	
18,500	74,000	.043000	.004500	.....	.....	
19,000	76,000	.0500	.0070	.....	.....	
19,500	78,000	.0587	.0037	.....	.....	
20,000	80,000	.0650	.0113	.....	.....	
20,500	82,000	.0750	.0100	.....	.....	
21,000	84,000	.0975	.0225	.....	.....	
21,290	85,160	.1450	.0475	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section ..... pounds.. 85,16
Elastic limit per square inch of original section ..... do... 39,0
Elongation per inch after rupture ..... inch.. .15
Elongation per inch under strain at elastic limit ..... do... .0011
Reduction in diameter at point of rupture ..... do... .
Reduction in area after rupture, per centum of original section ..... 27.
Position of rupture ..... 1".19 from
Character of broken surface ..... silky, 40 per cent.; granular, 60 per cent.; opened cracks in surface
stem in vicinity of fracture.
Elongation of inch sections ..... ".19*, ".24*, ".15, "

12-inch B. L. Rifle

Rear end of Jacket.



HEx. 165 512

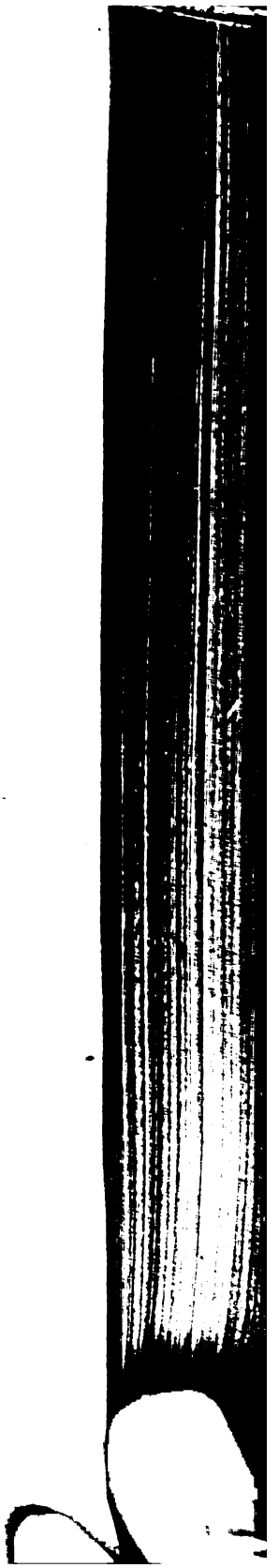
No. 3904.

Marks, $\frac{12\ R\ J}{B\ T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	0.	.....	
2,500	10,000	.000350	.000175	.....	.....	
5,000	20,000	.000650	.000300	.....	.....	
7,500	30,000	.001000	.000350	.....	.....	
8,750	35,000	.001175	.000175	.000050	.000050	
10,000	40,000	.001375	.000200	.....	.....	
10,500	42,000	.001400	.000025	.000050	0.	
10,750	43,000	.001425	.000025	.....	.....	
11,000	44,000	.001475	.000050	.....	.....	
11,250	45,000	.001550	.000075	.....	.....	
11,500	46,000	.001600	.000050	.....	.....	
11,750	47,000	.001625	.000025	.....	.....	
12,000	48,000	.001675	.000050	.....	.....	
12,250	49,000	.001700	.000025	.....	.....	Elastic limit.
12,500	50,000	.001800	.000100	.....	.....	
12,750	51,000	.001875	.000075	.....	.....	
13,000	52,000	.002125	.000250	.....	.....	
13,250	53,000	.003625	.001500	.....	.....	
13,500	54,000	.004625	.001000	.....	.....	
13,750	55,000	.005500	.000875	.....	.....	
14,000	56,000	.006250	.000750	.....	.....	
14,500	58,000	.007800	.001550	.....	.....	
15,000	60,000	.009250	.001450	.....	.....	
15,500	62,000	.011000	.001750	.....	.....	
16,000	64,000	.012750	.001750	.....	.....	
16,500	66,000	.014500	.001750	.....	.....	
17,000	68,000	.016275	.001775	.....	.....	
17,500	70,000	.018250	.001975	.....	.....	
18,000	72,000	.020250	.002000	.....	.....	
18,500	74,000	.022500	.002250	.....	.....	
19,000	76,000	.025000	.002500	.....	.....	
19,500	78,000	.027000	.002000	.....	.....	
20,000	80,000	.029750	.002750	.....	.....	
20,500	82,000	.033000	.003250	.....	.....	
21,000	84,000	.036000	.003000	.....	.....	
21,500	86,000	.040000	.004000	.....	.....	
22,000	88,000	.0450	.0050	.....	.....	
22,500	90,000	.0500	.0050	.....	.....	
23,000	92,000	.0550	.0050	.....	.....	
23,500	94,000	.0650	.0100	.....	.....	
24,000	96,000	.0750	.0100	.....	.....	
24,500	98,000	.0950	.0200	.....	.....	
24,710	98,840	.1275	.0325	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98,840
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.1600
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1".60 from neck
Character of broken surface		granular; dull silky band extending from circumference to center
Elongation of inch sections		".11, ".14, ".28*, ".11



No. 3905.

Marks, $\frac{12\ R\ J}{B\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000600	.000300	.....	.....	
7,500	30,000	.001000	.000100	.....	.....	
8,750	35,000	.001225	.000225	.000050	.000050	Elastic limit.
9,000	36,000	.001325	.000100	.....	.....	
9,250	37,000	.001400	.000075	.....	.....	
9,500	38,000	.001550	.000150	.....	.....	
9,750	39,000	.001775	.000225	.....	.....	
10,000	40,000	.002325	.000550	.....	.....	
10,250	41,000	.002825	.000500	.....	.....	
10,500	42,000	.003775	.000950	.002300	.002250	
10,750	43,000	.004250	.000475	.....	.....	
11,000	44,000	.005125	.000875	.....	.....	
11,500	46,000	.006750	.001625	.....	.....	
12,000	48,000	.008625	.001875	.....	.....	
12,500	50,000	.010500	.001875	.....	.....	
13,000	52,000	.012500	.002000	.....	.....	
13,500	54,000	.014750	.002250	.....	.....	
14,000	56,000	.016875	.002125	.....	.....	
14,500	58,000	.019500	.002625	.....	.....	
15,000	60,000	.022250	.002750	.....	.....	
15,500	62,000	.025000	.002750	.....	.....	
16,000	64,000	.028125	.003125	.....	.....	
16,500	66,000	.031750	.003625	.....	.....	
17,000	68,000	.035500	.003750	.....	.....	
17,500	70,000	.040000	.004500	.....	.....	
18,000	72,000	.0450	.0050	.....	.....	
18,500	74,000	.0500	.0050	.....	.....	
19,000	76,000	.0575	.0075	.....	.....	
19,500	78,000	.0700	.0125	.....	.....	
20,000	80,000	.0800	.0100	.....	.....	
20,500	82,000	.0950	.0150	.....	.....	
20,640	82,560	.1500	.0550	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,560
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.1650
Elongation per inch under strain at elastic limit	do...	.001225
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		2". 15 from neck
Character of broken surface		granular, 50 per cent.; dull silky, 50 per cent
Elongation of inch sections		".12, ".26*, ".16, ".12

No. 804.

Marks, $\frac{12\ R\ J}{B\ T_c\ I}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1, 000	0.	0.	0.	0.	Initial load.
2, 500	5, 000	.000167	.000167	.....	.....	
5, 000	10, 000	.000300	.000133	.....	.....	
7, 500	15, 000	.000500	.000200	.....	.....	
10, 000	20, 000	.000633	.000133	.....	.....	
12, 500	25, 000	.000800	.000167	.....	.....	
15, 000	30, 000	.000933	.000133	0.	.....	
17, 500	35, 000	.001100	.000167	.....	.....	
19, 000	38, 000	.001200	.000100	.....	.....	
19, 500	39, 000	.001233	.000033	.....	.....	
20, 000	40, 000	.001300	.000067	0.	.....	
20, 500	41, 000	.001333	.000033	.....	.....	
21, 000	42, 000	.001367	.000034	.....	.....	
21, 500	43, 000	.001400	.000033	.....	.....	
22, 000	44, 000	.001433	.000033	.....	.....	Elastic limit.
22, 500	45, 000	.001600	.000167	.....	.....	
23, 000	46, 000	.001833	.000233	.....	.....	
23, 500	47, 000	.002967	.001134	.....	.....	
24, 000	48, 000	.005167	.002200	.....	.....	
24, 500	49, 000	.006000	.000833	.....	.....	
25, 000	50, 000	.006733	.000783	.....	.....	
39, 910	79, 820	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 805.

Marks, $\frac{12\ R\ J}{B\ T,\ 0}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000133	.000133	.....	.....	
5,000	10,000	.000300	.000167	.....	.....	
7,500	15,000	.000467	.000167	.....	.....	
10,000	20,000	.000633	.000166	.....	.....	
12,500	25,000	.000767	.000134	.....	.....	
15,000	30,000	.000933	.000166	0.	.....	
17,500	35,000	.001100	.000167	.....	.....	
19,000	38,000	.001200	.000100	.....	.....	
19,500	39,000	.001233	.000033	.....	.....	
20,000	40,000	.001300	.000067	0.	.....	
20,500	41,000	.001333	.000033	.....	.....	
21,000	42,000	.001367	.000034	.....	.....	
21,500	43,000	.001400	.000033	.....	.....	
22,000	44,000	.001433	.000033	.....	.....	
22,500	45,000	.001500	.000067	.....	.....	
23,000	46,000	.001567	.000067	.....	.....	Elastic limit.
23,500	47,000	.001667	.000100	.....	.....	
24,000	48,000	.001767	.000100	.....	.....	
24,500	49,000	.001933	.000166	.....	.....	
25,000	50,000	.002200	.000267	.....	.....	
25,500	51,000	.002433	.000233	.....	.....	
26,000	52,000	.002767	.000334	.....	.....	
26,500	53,000	.003100	.000333	.....	.....	
27,000	54,000	.003333	.000233	.....	.....	
27,500	55,000	.004067	.000734	.....	.....	
28,000	56,000	.004567	.000500	.....	.....	
28,500	57,000	.005133	.000566	.....	.....	
29,000	58,000	.005900	.000767	.....	.....	
46,100	92,200	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 806.

Marks, 12 R J / B E_c
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
500	5,000	.000100	.000100	.....	.....	
000	10,000	.000233	.000133	.....	.....	
500	15,000	.000400	.000167	.....	.....	
000	20,000	.000533	.000133	.....	.....	
500	25,000	.000700	.000167	.....	.....	
000	30,000	.000867	.000167	0.	.....	
000	35,000	.001033	.000166	.....	.....	
000	40,000	.001100	.000067	.....	.....	
000	40,000	.001133	.000033	.....	.....	
000	40,000	.001133	0.	—.000167	—.000167	Elastic limit.
000	41,000	.001300	.000167	.....	.....	
000	42,000	.001833	.000533	.....	.....	
000	43,000	.002333	.000500	.....	.....	
000	44,000	.002867	.000534	.....	.....	
000	45,000	.003467	.000600	.....	.....	
000	46,000	.004067	.000600	.....	.....	
000	47,000	.005133	.000866	.....	.....	
000	48,000	.006233	.001100	.....	.....	
000	49,000	.006833	.000600	.....	.....	
000	50,000	.007667	.000834	.....	.....	
000	78,360	.....	.....	.....	.....	Ultimate strength.

d by triple flexure.

No. 807.

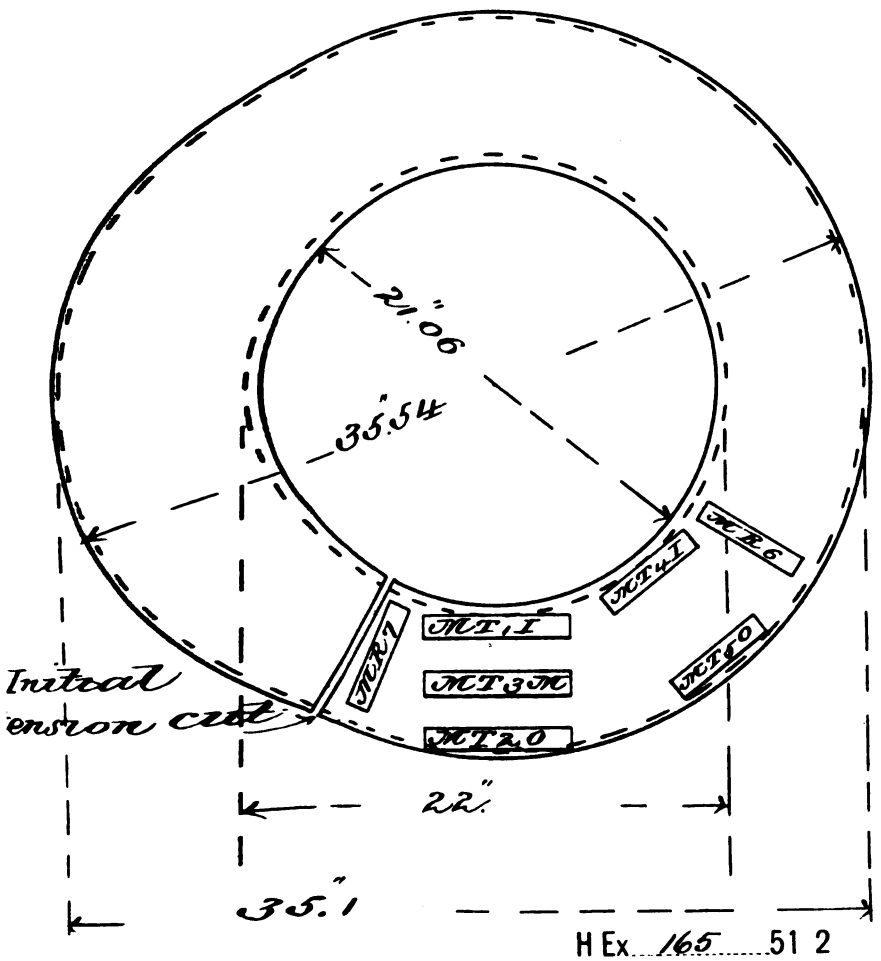
Marks, $\frac{12\ R\ J}{B\ R}$.
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Sucessive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000233	.000133	.....	.....	
7,500	15,000	.000400	.000167	.....	.....	
10,000	20,000	.000533	.000133	.....	.....	
12,500	25,000	.000700	.000167	.....	.....	
15,000	30,000	.000900	.000200	0.		
17,500	35,000	.001033	.000133	.....	.....	
19,000	38,000	.001133	.000100	.....	.....	
19,500	39,000	.001167	.000034	.....	.....	
20,000	40,000	.001167	0.	0.	.....	Elastic limit.
20,500	41,000	.001533	.000366	.....	.....	
21,000	42,000	.001867	.000334	.....	.....	
21,500	43,000	.002300	.000433	.....	.....	
22,000	44,000	.002967	.000667	.....	.....	
22,500	45,000	.003500	.000533	.....	.....	
23,000	46,000	.004067	.000567	.....	.....	
23,500	47,000	.004900	.000833	.....	.....	
24,000	48,000	.005433	.000533	.....	.....	
24,500	49,000	.006267	.000834	.....	.....	
25,000	50,000	.007267	.001000	.....	.....	
39,470	78,940	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

12-inch B. L. Rifle

Front end of Jacket



H Ex 165 51 2

FRONT END.

No. 3906.

Marks, $\frac{12\ R\ J}{M\ T_1\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.		
2,500	10,000	.000375	.000225			
5,000	20,000	.000700	.000325			
7,500	30,000	.001000	.000300			
8,750	35,000	.001200	.000200	0.		
10,000	40,000	.001425	.000225	0.		
10,500	42,000	.001450	.000025	0.		
10,750	43,000	.001475	.000025			
11,000	44,000	.001500	.000025			
11,250	45,000	.001550	.000050			
11,500	46,000	.001600	.000050			
11,750	47,000	.001625	.000025			
12,000	48,000	.001675	.000050			
12,250	49,000	.001725	.000050			Elastic limit.
12,500	50,000	.001850	.000125			
12,750	51,000	.002100	.000250			
13,000	52,000	.002500	.000400			
13,250	53,000	.003150	.000650			
13,500	54,000	.003925	.000775			
14,000	56,000	.005000	.001075			
14,500	58,000	.006500	.001500			
15,000	60,000	.008025	.001525			
15,500	62,000	.009800	.001775			
16,000	64,000	.011500	.001700			
16,500	66,000	.013375	.001875			
17,000	68,000	.015000	.001625			
17,500	70,000	.016875	.001875			
18,000	72,000	.018700	.001825			
18,500	74,000	.021000	.002300			
19,000	76,000	.022750	.001750			
19,500	78,000	.025000	.002250			
20,000	80,000	.027500	.002500			
20,500	82,000	.030500	.003000			
21,000	84,000	.033500	.003000			
21,500	86,000	.037000	.003500			
22,000	88,000	.041000	.004000			
22,500	90,000	.045000	.004000			
23,000	92,000	.0500	.0050			
23,500	94,000	.0550	.0050			
24,000	96,000	.0675	.0125			
24,500	98,000	.0800	.0125			
24,910	99,640	.1175	.0375			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,640
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.001725
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		".60 from neck
Character of broken surface		granular; silky center
Elongation of inch sections		".07, ".09, ".12, ".28*

No. 3907.

Marks, $\frac{12\ R\ J}{M\ T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000300	.000150	.....	.....	
5,000	20,000	.000650	.000350	.....	.....	
7,500	30,000	.000975	.000325	.....	.....	
8,750	35,000	.001150	.000175	0.	.....	
10,000	40,000	.001250	.000100	.....	.....	
10,500	42,000	.001350	.000100	0.	.....	
10,750	43,000	.001375	.000025	.....	.....	
11,000	44,000	.001400	.000025	.....	.....	
11,250	45,000	.001425	.000025	.....	.....	
11,500	46,000	.001450	.000025	.....	.....	
11,750	47,000	.001500	.000050	.....	.....	
12,000	48,000	.001550	.000050	.....	.....	
12,250	49,000	.001600	.000050	.....	.....	
12,500	50,000	.001650	.000050	.000025	.000025	
12,750	51,000	.001706	.000050	.....	.....	
13,000	52,000	.001750	.000050	.....	.....	Elastic limit.
13,250	53,000	.003375	.001625	.....	.....	
13,500	54,000	.005025	.001650	.....	.....	
13,750	55,000	.006000	.000975	.....	.....	
14,000	56,000	.007000	.001000	.....	.....	
14,500	58,000	.008675	.001675	.....	.....	
15,000	60,000	.010425	.001750	.....	.....	
15,500	62,000	.012500	.002075	.....	.....	
16,000	64,000	.014375	.001875	.....	.....	
16,500	66,000	.016250	.001875	.....	.....	
17,000	68,000	.018250	.002000	.....	.....	
17,500	70,000	.020500	.002250	.....	.....	
18,000	72,000	.022500	.002000	.....	.....	
18,500	74,000	.025000	.002500	.....	.....	
19,000	76,000	.027500	.002500	.....	.....	
19,500	78,000	.030500	.003000	.....	.....	
20,000	80,000	.033500	.003000	.....	.....	
20,500	82,000	.0350	.0015	.....	.....	
21,000	84,000	.0425	.0075	.....	.....	
21,500	86,000	.0475	.0050	.....	.....	
22,000	88,000	.0525	.0050	.....	.....	
22,500	90,000	.0600	.0075	.....	.....	
23,000	92,000	.0725	.0125	.....	.....	
23,500	94,000	.0875	.0150	.....	.....	
23,860	95,440	.1325	.0450	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds...	95,440
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1".40 from neck
Character of broken surface	silky, 60 per cent.; granular at circumference, 40 per cent	
Elongation of inch sections		".15, ".32*, ".12, ".09

No. 3908.

Marks, 12 R J / M T, M
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000325	.000225	.....	.....	
5,000	20,000	.000675	.000350	.....	.....	
7,500	30,000	.001000	.000325	.....	.....	
8,750	35,000	.001200	.000200	0.	.....	
10,000	40,000	.001425	.000225	.....	.....	
10,500	42,000	.001475	.000050	.000050	.000050	Elastic limit.
10,750	43,000	.001575	.000100	.....	.....	
11,000	44,000	.001775	.000200	.....	.....	
11,250	45,000	.002050	.000275	.....	.....	
11,500	46,000	.003250	.001200	.....	.....	
11,750	47,000	.004500	.001250	.....	.....	
12,000	48,000	.004950	.000450	.....	.....	
12,250	49,000	.005425	.000475	.....	.....	
12,500	50,000	.006250	.000825	.....	.....	
12,750	51,000	.007925	.001675	.....	.....	
13,000	52,000	.009625	.001700	.....	.....	
13,500	54,000	.011475	.001850	.....	.....	
14,000	56,000	.013000	.001525	.....	.....	
14,500	58,000	.015075	.002075	.....	.....	
15,000	60,000	.017250	.002175	.....	.....	
15,500	62,000	.019375	.002125	.....	.....	
16,000	64,000	.021750	.002375	.....	.....	
16,500	66,000	.024200	.002450	.....	.....	
17,000	68,000	.027125	.002935	.....	.....	
17,500	70,000	.030000	.002875	.....	.....	
18,000	72,000	.033000	.003000	.....	.....	
18,500	74,000	.036625	.003625	.....	.....	
19,000	76,000	.0425	.005875	.....	.....	
19,500	78,000	.0475	.0050	.....	.....	
20,000	80,000	.0525	.0050	.....	.....	
20,500	82,000	.0575	.0050	.....	.....	
21,000	84,000	.0700	.0125	.....	.....	
21,500	86,000	.0825	.0125	.....	.....	
22,000	88,000	.1075	.0250	.....	.....	
22,500	90,000	.1525	.0450	.....	.....	Tensile strength.
22,680	90,720					

General summary.

Tensile strength per square inch of original section	pounds..	90,720
Elastic limit per square inch of original section	do...	42,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.001475
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1".40 from neck
Character of broken surface		silky
Elongation of inch sections		".10, ".14, ".34*, ".18

No. 808.

Marks, $\frac{12\ R\ J}{M\ T_4\ I}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000267	.000167	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000600	.000167	.....	.....	
12,500	25,000	.000733	.000133	.....	.....	
15,000	30,000	.000900	.000167	0.	.....	
17,500	35,000	.001067	.000167	.....	.....	
20,000	40,000	.001233	.000166	0.	.....	
20,500	41,000	.001267	.000034	.....	.....	
21,000	42,000	.001267	0.	.....	.....	
21,500	43,000	.001300	.000033	.....	.....	
22,000	44,000	.001333	.000033	.....	.....	
22,500	45,000	.001367	.000034	.....	.....	
23,000	46,000	.001400	.000033	.....	.....	
23,500	47,000	.001433	.000033	.....	.....	
24,000	48,000	.001500	.000067	.....	.....	
24,500	49,000	.001500	0.	.....	.....	
25,000	50,000	.001533	.000033	.....	.....	
25,500	51,000	.001567	.000034	.....	.....	
26,000	52,000	.001600	.000033	.....	.....	Elastic limit.
26,500	53,000	.001733	.000133	.....	.....	
27,000	54,000	.003233	.001500	.....	.....	
27,500	55,000	.005833	.002600	.....	.....	
28,000	56,000	.006500	.000667	.....	.....	
44,070	88,140	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 809.

Marks, $\frac{12\ R\ J}{M\ T_2\ O}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000267	.000167	.....	.....	
7,500	15,000	.000400	.000133	.....	.....	
10,000	20,000	.000533	.000133	.....	.....	
12,500	25,000	.000700	.000167	.....	.....	
15,000	30,000	.000950	.000250	0.	.....	
17,500	35,000	.001100	.000150	.....	.....	
20,000	40,000	.001267	.000167	0.	.....	
22,500	45,000	.001400	.000133	.....	.....	
23,000	46,000	.001433	.000033	.....	.....	
23,500	47,000	.001467	.000034	.....	.....	
24,000	48,000	.001500	.000033	.....	.....	Elastic limit.
24,500	49,000	.001833	.000333	.....	.....	
25,000	50,000	.002500	.000667	.....	.....	
25,500	51,000	.003267	.000767	.....	.....	
26,000	52,000	.003833	.000566	.....	.....	
26,500	53,000	.004500	.000667	.....	.....	
27,000	54,000	.004933	.000433	.....	.....	
27,500	55,000	.005467	.000534	.....	.....	
28,000	56,000	.006433	.000966	.....	.....	
43,300	86,600	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 810.

Marks, $\frac{12\ R\ J}{M\ R_4}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000267	.000167	.....	.....	
7,500	15,000	.000433	.000166	.....	.....	
10,000	20,000	.000600	.000167	.....	.....	
12,500	25,000	.000733	.000133	.....	.....	
15,000	30,000	.000900	.000167	0.	.....	
17,500	35,000	.001067	.000167	.....	.....	
20,000	40,000	.001267	.001200	0.	.....	
20,500	41,000	.001300	.000033	.....	.....	
21,000	42,000	.001300	0.	.....	.....	
21,500	43,000	.001333	.000033	.....	.....	
22,000	44,000	.001367	.000034	.....	.....	Elastic limit.
22,500	45,000	.001500	.000133	.....	.....	
23,000	46,000	.001700	.000200	.....	.....	
23,500	47,000	.002033	.000333	.....	.....	
24,000	48,000	.003300	.001267	.....	.....	
24,500	49,000	.003867	.000567	.....	.....	
25,000	50,000	.004533	.000666	.....	.....	
25,500	51,000	.005100	.000567	.....	.....	
26,000	52,000	.005767	.000667	.....	.....	
26,500	53,000	.006500	.000733	.....	.....	
27,000	54,000	.007167	.000667	.....	.....	
42,570	85,140	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 811.

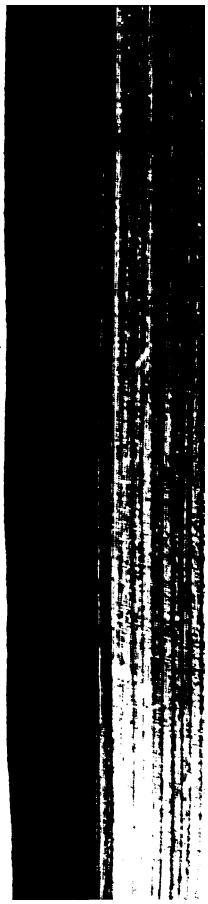
Marks, $\frac{12\ R\ J}{M\ R_7}$
Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000100	.000100	.....	.....	
5,000	10,000	.000233	.000133	.....	.....	
7,500	15,000	.000400	.000167	.....	.....	
10,000	20,000	.000567	.000167	.....	.....	
12,500	25,000	.000733	.000166	.....	.....	
15,000	30,000	.000900	.000167	0.	.....	
17,500	35,000	.001067	.000167	.....	.....	
20,000	40,000	.001233	.000166	0.	.....	
20,500	41,000	.001267	.000034	.....	.....	
21,000	42,000	.001267	0.	.....	.....	
21,500	43,000	.001300	.000033	.....	.....	
22,000	44,000	.001333	.000033	.....	.....	Elastic limit.
22,500	45,000	.001467	.000134	.....	.....	
23,000	46,000	.001667	.000200	.....	.....	
23,500	47,000	.002333	.000666	.....	.....	
24,000	48,000	.003567	.001234	.....	.....	
24,500	49,000	.004100	.000533	.....	.....	
25,000	50,000	.004667	.000567	.....	.....	
25,500	51,000	.005333	.000666	.....	.....	
26,000	52,000	.005967	.000634	.....	.....	
26,500	53,000	.006667	.000700	.....	.....	
27,000	54,000	.007267	.000600	.....	.....	
42,910	85,820	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

12-INCH B. L. RIFLE, NO. 1.

SPECIMENS FROM HOOPS GAS CHECK, AND BREECH BUSHING.



No. 3901.

Marks, $\frac{12\ R\ A_1}{T.\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000250	.000150	.....	.....	
5,000	20,000	.000550	.000300	.....	.....	
7,500	30,000	.000900	.000350	.....	.....	
10,000	40,000	.001275	.000375	.....	.....	
11,250	45,000	.001425	.000150	0.	.....	
12,500	50,000	.001600	.000175	.000025	.000025	Elastic limit.
12,750	51,000	.004375	.002775	.....	.....	
13,000	52,000	.006500	.002125	.....	.....	
13,250	53,000	.006975	.000475	.....	.....	
13,750	55,000	.007950	.000975	.....	.....	
14,250	57,000	.009750	.001800	.....	.....	
14,750	59,000	.011500	.001750	.....	.....	
15,250	61,000	.013250	.001750	.....	.....	
15,750	63,000	.014750	.001500	.....	.....	
23,910	95,640	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,640
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.1625
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.004
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		at middle of stem
Character of broken surface, granular, 50 per cent.; silky, 50 per cent. Opened cracks in surface of stem in vicinity of place of rupture.		
Elongation of inch sections		".13, ".25, ".17, ".19

HOOP A_5.

No. 3871.

Marks, $\frac{12\ B_1\ A_5}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000250	.000175	.....	.....	
5,000	20,000	.000575	.000325	.....	.....	
7,500	30,000	.000900	.000325	.....	.....	
10,000	40,000	.001250	.000350	.....	.....	
11,250	45,000	.001425	.000175	0.	.....	
12,500	50,000	.001575	.000150	0.	.....	
12,750	51,000	.001625	.000050	.....	.....	
13,000	52,000	.001700	.000075	.....	.....	
13,250	53,000	.001775	.000075	.....	.....	Elastic limit.
13,500	54,000	.001900	.000125	.....	.....	
13,750	55,000	.002100	.000200	.....	.....	
14,000	56,000	.002700	.000600	.....	.....	
14,500	58,000	.004875	.002175	.....	.....	
15,000	60,000	.007000	.002125	.....	.....	
15,500	62,000	.009500	.002500	.....	.....	
16,000	64,000	.010500	.001000	.....	.....	
16,500	66,000	.012250	.001750	.....	.....	
24,060	96,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section .....pounds.
Elastic limit per square inch of original section .....do..
Elongation per inch after rupture .....inch.
Elongation per inch under strain at elastic limit .....do..
Reduction in diameter at point of rupture .....do..
Reduction in area after rupture, per centum of original section .....
Position of rupture .....1".50 f
Character of broken surface .....
Elongation of inch sections .....".11, ".16, "

HOOP B_2.

No. 3867.

Marks, $\frac{12\ R_1\ B_2}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	0.	.....	
2,500	10,000	.000400	.000225	.....	.....	
5,000	20,000	.000750	.000350	.....	.....	
7,500	30,000	.001125	.000375	.....	.....	
10,000	40,000	.001450	.000325	.....	.....	
11,250	45,000	.001625	.000175	.000025	.000025	
12,500	50,000	.001775	.000150	.....	.....	
12,750	51,000	.001800	.000025	.....	.....	
13,000	52,000	.001825	.000025	.....	.....	
13,250	53,000	.001850	.000025	.....	.....	
13,500	54,000	.001900	.000050	.....	.....	
13,750	55,000	.001900	0.	.....	.....	
14,000	56,000	.001925	.000025	.....	.....	
14,250	57,000	.001975	.000050	.....	.....	
14,500	58,000	.002050	.000075	.....	.....	
14,750	59,000	.002100	.000050	.....	.....	
15,000	60,000	.002150	.000050	.....	.....	
15,250	61,000	.002175	.000025	.....	.....	Elastic limit, not well defined.
15,500	62,000	.002250	.000075	.....	.....	
15,750	63,000	.002325	.000075	.....	.....	
16,000	64,000	.002425	.000100	.....	.....	
16,250	65,000	.002525	.000100	.....	.....	
16,500	66,000	.002750	.000225	.....	.....	
17,000	68,000	.003775	.001025	.....	.....	
17,500	70,000	.006275	.002500	.....	.....	
18,000	72,000	.007850	.001575	.....	.....	
18,500	74,000	.009800	.001950	.....	.....	
27,420	109,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	109,680
Elastic limit per square inch of original section, not well defined	do...	61,000
Elongation per inch after rupture	inch..	0.1600
Elongation per inch under strain at elastic limit	do...	.002175
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.60 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		″.11, ″.28, ″.14, ″.11

Hoop B_3.

No. 3872.

Marks, $\frac{12\ B_3\ B_3}{T.\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000125	.000125	0.	.....	Initial load.
2,500	10,000	.000250	.000125	.....	.....	
5,000	20,000	.000625	.000375	.....	.....	
7,500	30,000	.000950	.000325	.....	.....	
10,000	40,000	.001325	.000375	.....	.....	
11,250	45,000	.001450	.000125	0.	.....	
12,500	50,000	.001625	.000175	0.	.....	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001700	.000050	.....	.....	
13,250	53,000	.001750	.000050	.....	.....	
13,500	54,000	.001800	.000050	.....	.....	
13,750	55,000	.001850	.000050	.....	.....	
14,000	56,000	.001900	.000050	.....	.....	
14,250	57,000	.001925	.000025	.....	.....	
14,500	58,000	.001975	.000050	.....	.....	
14,750	59,000	.002050	.000075	.....	.....	Elastic limit.
15,000	60,000	.002175	.000125	.....	.....	
15,250	61,000	.002325	.000150	.....	.....	
15,500	62,000	.002675	.000350	.....	.....	
16,000	64,000	.003900	.001225	.....	.....	
16,500	66,000	.005750	.001850	.....	.....	
17,000	68,000	.007500	.001750	.....	.....	
17,500	70,000	.009000	.001500	.....	.....	
18,000	72,000	.010750	.001170	.....	.....	
27,120	108,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,480
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch...	.1750
Elongation per inch under strain at elastic limit	do..	.002050
Reduction in diameter at point of rupture	do...	.194
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		".6 from middle of stem
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".14, ".29*, ".16, ".11

12-INCH B. L. RIFLE, NO. 1.

HOOP C_4.

No. 3839.

Marks, $^{12\ B_1\ C_4}_{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,480	0.	0.	0.	0.	
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	Initial load.
5,000	20,000	.000675	.000375	.....	.....	
7,500	30,000	.001025	.000350	.....	.....	
10,000	40,000	.001425	.000400	.....	.....	
11,250	45,000	.001550	.000125	0.	.....	
12,500	50,000	.001750	.000200	0.	.....	
12,750	51,000	.001775	.000025	.....	.....	
13,000	52,000	.001800	.000025	.....	.....	
13,250	53,000	.001825	.000025	.....	.....	
13,500	54,000	.001875	.000050	.....	.....	
13,750	55,000	.001925	.000050	.....	.....	
14,000	56,000	.001975	.000050	.....	.....	
14,250	57,000	.0020.5	.000050	.....	.....	
14,500	58,000	.002075	.000050	.....	.....	Elastic limit.
14,750	59,000	.002200	.000125	.....	.....	
15,000	60,000	.002400	.000200	.....	.....	
15,250	61,000	.002825	.000425	.....	.....	
15,750	63,000	.003700	.000875	.....	.....	
16,250	65,000	.007250	.003550	.....	.....	
16,750	67,000	.009250	.002000	.....	.....	
17,250	69,000	.011200	.001950	.....	.....	
17,750	71,000	.013750	.002550	.....	.....	
24,620	98,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section.....pounds.
Elastic limit per square inch of original section.....do.
Elongation per inch after rupture.....inch.
Elongation per inch under strain at elastic limit.....do.
Reduction in diameter at point of rupture.....do.
Reduction in area after rupture, per centum of original section.....
Position of rupture.....1".25
Character of broken surface.....
Elongation of inch sections.....".20, ".2

Hoop C_3.

No. 3868.

Marks, $\frac{12\ R_1\ C_3}{B\ T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000350	.000200	.....	.....	
5,000	20,000	.000725	.000375	.....	.....	
7,500	30,000	.001025	.000300	.....	.....	
10,000	40,000	.001400	.000375	.....	.....	
11,250	45,000	.001550	.000150	.000025	.000025	
12,500	50,000	.001750	.000200	.000025	0.	
12,750	51,000	.001800	.000050	.....	.....	
13,000	52,000	.001825	.000025	.....	.....	
13,250	53,000	.001875	.000050	.....	.....	
13,500	54,000	.001925	.000050	.....	.....	
13,750	55,000	.001925	0.	.....	.....	
14,000	56,000	.002000	.000075	.....	.....	
14,250	57,000	.002050	.000050	.....	.....	Elastic limit.
14,500	58,000	.002125	.000075	.....	.....	
14,750	59,000	.002300	.000175	.....	.....	
15,000	60,000	.002500	.000200	.....	.....	
15,500	62,000	.003050	.000550	.....	.....	
16,000	64,000	.004875	.001825	.....	.....	
16,500	66,000	.006750	.001875	.....	.....	
17,000	68,000	.008750	.002000	.....	.....	
25,960	103,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,840
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	0.1725
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture		0.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2".25 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		".10, ".20*, ".27, ".13

No. 3853.

Marks, $\frac{12\ R_1\ C_2}{B\ T_4\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000300	.000225	.....	.....	
5,000	20,000	.000625	.000325	.....	.....	
7,500	30,000	.000925	.000300	.....	.....	
10,000	40,000	.001300	.000375	.....	.....	
11,250	45,000	.001475	.000175	0.	.....	
12,500	50,000	.001675	.000200	0.	.....	
12,750	51,000	.001700	.000025	.....	.....	
13,000	52,000	.001725	.000025	.....	.....	
13,250	53,000	.001775	.000050	.....	.....	
13,500	54,000	.001850	.000075	.....	.....	
13,750	55,000	.001900	.000050	.....	.....	
14,000	56,000	.002000	.000100	.....	.....	
14,520	57,000	.002050	.000050	.....	.....	Elastic limit.
14,500	58,000	.002225	.000175	.....	.....	
14,750	59,000	.002375	.000150	.....	.....	
15,000	60,000	.002575	.000200	.....	.....	
15,500	62,000	.003625	.001050	.....	.....	
16,000	64,000	.005175	.001550	.....	.....	
16,500	66,000	.006750	.001575	.....	.....	
17,000	68,000	.008375	.001625	.....	.....	
17,500	70,000	.010000	.001625	.....	.....	
26,420	105,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section .....pounds.. 105,6
Elastic limit per square inch of original section .....do... 57,0
Elongation per inch after rupture .....inch.. 0.015
Elongation per inch under strain at elastic limit .....do... .002
Reduction in diameter at point of rupture .....do...
Reduction in area after rupture, per centum of original section .....
Position of rupture .....2″. 20 from r
Character of broken surface .....granular, silky ce
Elongation of inch sections .....″0. 09, ″. 24, ″. 18,

Hoop D_2.

No. 3865.

Marks, $\frac{12\ R_1\ D_2}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000375	.000250	.....	.....	
5,000	20,000	.000675	.000300	.....	.....	
7,500	30,000	.001025	.000350	.....	.....	
10,000	40,000	.001425	.000400	.....	.....	
11,250	45,000	.001575	.000150	.000025	.000025	
12,500	50,000	.001775	.000200	.000100	.000075	
12,750	51,000	.001850	.000075	.....	.....	
12,800	52,000	.001875	.000025	.....	.....	
13,250	53,000	.001925	.000050	.....	.....	
13,500	54,000	.002000	.000075	.....	.....	Elastic limit.
13,750	55,000	.002150	.000150	.....	.....	
14,000	56,000	.002300	.000150	.....	.....	
14,250	57,000	.002550	.000250	.....	.....	
14,750	59,000	.004250	.001700	.....	.....	
15,250	61,000	.006625	.002375	.....	.....	
15,750	63,000	.008500	.001875	.....	.....	
16,250	65,000	.010300	.001800	.....	.....	
16,750	67,000	.012000	.001700	.....	.....	
24,280	97,120	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,120
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	0.1750
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per centum of original section		47.2
Position of rupture		1".40 from neck
Character of broken surface		silky
Elongation of inch sections		".08, ".10, ".23*, ".19

HOOP D_4.

No. 3854.

Marks, $\frac{12\ R_1\ D_4}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	0.	.....	
2,500	10,000	.000200	.000150	.....	.....	
5,000	20,000	.000500	.000300	.....	.....	
7,500	30,000	.000825	.000325	.....	.....	
10,000	40,000	.001175	.000350	.....	.....	
11,250	45,000	.001325	.000150	.000025	.000025	
12,500	50,000	.001625	.000300	.000025	0.	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001700	.000050	.....	.....	
13,250	53,000	.001725	.000025	.....	.....	
13,500	54,000	.001775	.000050	.....	.....	
13,750	55,000	.001800	.000025	.....	.....	
14,000	56,000	.001825	.000025	.....	.....	
14,250	57,000	.001850	.000025	.....	.....	
14,500	58,000	.001925	.000075	.....	.....	
14,750	59,000	.001975	.000050	.....	.....	Elastic limit.
15,000	60,000	.002125	.000150	.....	.....	
15,250	61,000	.002925	.000800	.....	.....	
15,500	62,000	.004375	.001450	.....	.....	
16,000	64,000	.005450	.001075	.....	.....	
16,500	66,000	.008750	.003300	.....	.....	
17,000	68,000	.010300	.001550	.....	.....	
17,500	70,000	.012000	.001700	.....	.....	
18,000	72,000	.013700	.001700	.....	.....	
25,320	101,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,280
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	0.1750
Elongation per inch under strain at elastic limit	do...	.001975
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1". 15 from neck
Character of broken surface		silky
Elongation of inch sections		".30*, ".20, "11, ".09

12-INCH STEEL B. L. RIFLE, NO. 1.

Specific gravity and hardness of hoops.

Hoop.	Marks on specimen.	Specific gravity.	Hardness.
A_2	12 R_1 A_2 R_4 M ...	7.8489	21.64
B_2	12 R_1 B_2 R_4 M ...	7.8481	23.70
C_4	12 R_1 C_4 R_4 M ...	7.8511	20.93
D_2	12 R_1 D_2 R_4 M ...	7.8481	22.39

TRUNNION HOOP.

No. 3902.

Marks, $\frac{12\ R\ T\ H}{T_1\ M}$
Diameter, ".564."
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.		
2,500	10,000	.000300	.000150			
5,000	20,000	.000675	.000375			
7,500	30,000	.000975	.000300			
9,000	40,000	.001350	.000375			
11,000	44,000	.001475	.000125			Elastic limit.
12,250	45,000	.003625	.002150	.002050	.002050	
12,500	46,000	.004325	.000700			
11,750	47,000	.004750	.000425			
12,000	48,000	.006425	.001675	.004575	.002525	
12,500	50,000	.007750	.001325			
13,000	52,000	.009750	.002000			
13,500	54,000	.011750	.002000			
14,000	56,000	.013375	.001625			
14,250	58,000	.015750	.002375			
22,290	89,160					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,160
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	0.2075
Elongation per inch under strain at elastic limit	do...	.001475
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		49.7
Location of rupture		2" from neck
Character of broken surface		silky
Reduction of inch sections		".13, ".41, ".17, "12

GAS CHECK.

No. 3855.

Marks, $\frac{12\ R_1\ G\ C}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
7,500	30,000	.001000	.000733	.....	.....	
12,500	50,000	.001667	.000667	.....	.....	
15,000	60,000	.002000	.000333	0.	.....	
17,500	70,000	.002333	.000333	0.	.....	
17,750	71,000	.002367	.000034	.....	.....	
18,000	72,000	.002400	.000033	.....	.....	
18,250	73,000	.002433	.000033	.....	.....	Elastic limit.
18,500	74,000	.002533	.000100	.....	.....	
18,750	75,000	.002633	.000100	.....	.....	
19,000	76,000	.002867	.000234	.....	.....	
19,500	78,000	.003367	.000500	.....	.....	
20,000	80,000	.004167	.000800	.....	.....	
20,500	82,000	.004900	.000733	.....	.....	
21,000	84,000	.005933	.001033	.....	.....	
21,500	86,000	.007000	.001067	.....	.....	
33,680	134,720	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	134,72
Elastic limit per square inch of original section	do	73,0
Elongation per inch after rupture	inch	0.12
Elongation per inch under strain at elastic limit	do	.002
Reduction in diameter at point of rupture	do	.0
Reduction in area after rupture, per centum of original section		34.
Position of rupture		1″.30 from
Character of broken surface		granular, silky eccentric
Elongation of inch sections		″.10, ″.18,* ″.1

BREECH BUSHING.

No. 3369.

Marks, $\frac{12\ R_1\ B\ B_2}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000333	.000166	.....	.....	
5,000	20,000	.000667	.000334	.....	.....	
7,500	30,000	.000967	.000300	.....	.....	
10,000	40,000	.001267	.000300	0.	.....	
11,500	46,000	.001567	.000300	0.	.....	
11,750	47,000	.001600	.000033	.....	.....	
12,000	48,000	.001633	.000033	.....	.....	
12,250	49,000	.001667	.000034	.....	.....	
12,500	50,000	.001667	0.	.....	.....	
12,750	51,000	.001700	.000033	.....	.....	
13,000	52,000	.001800	.000100	.....	.....	
13,250	53,000	.001833	.000033	.....	.....	
13,500	54,000	.001867	.000034	.....	.....	
13,750	55,000	.001900	.000033	.....	.....	
14,000	56,000	.001933	.000033	.....	.....	
14,250	57,000	.001967	.000034	.....	.....	
14,500	58,000	.002033	.000066	.....	.....	
14,750	59,000	.002067	.000034	.....	.....	
15,000	60,000	.002100	.000033	.....	.....	
15,250	61,000	.002167	.000067	.....	.....	
15,500	62,000	.002233	.000066	.....	.....	
15,750	63,000	.002333	.000100	.....	.....	Elastic limit.
16,000	64,000	.002500	.000167	.....	.....	
16,250	65,000	.002833	.000333	.....	.....	
16,500	66,000	.003333	.000500	.....	.....	
17,000	68,000	.004767	.001434	.....	.....	
17,500	70,000	.007167	.002400	.....	.....	
18,000	72,000	.009000	.001833	.....	.....	
18,500	74,000	.011167	.002167	.....	.....	
19,000	76,000	.013000	.001833	.....	.....	
26,870	106,280	.....	.....	.....	.....	Tensile strength

General summary.

Tensile strength per square inch of original section ..... pounds
Elastic limit per square inch of original section ..... do.
Elongation per inch after rupture ..... inch
Elongation per inch under strain at elastic limit ..... do.
Reduction in diameter at point of rupture ..... do.
Reduction in area after rupture, per centum of original section .....
Position of rupture ..... 1″. 10
Character of broken surface, granular, dull silky spot, extending from the circumference to fracture.
Elongation of inch sections ..... ″,22*

TABULATION OF COMPRESSION SPECIMENS FROM TUBE AND JACKET FOR 12-INCH B. L. RIFLE, NO. 1.

No. of test.	Position in gun	Location of specimens.	Elastic limit per square inch.	Ultimate strength per square inch.	Manner of failure.
			Pounds.	*Pounds.*	
797	Steel tube	Radial	35,000	69,360	Triple flexure.
798	....do	....do	34,000	68,540	Do.
795	....do	Inside	31,000	44,200	Do.
796	....do	Outside	33,000	46,470	Do.
799	....do	Inside	38,000	65,800	Do.
800	....do	Outside	34,000	70,960	Do.
801	....do	Inside	47,000	82,600	Do.
802	....do	Ontside	49,000	84,820	Do.
803	....do	Radial	43,000	91,160	Double flexure.
804	Steel jacket	Inside	44,000	79,820	Triple flexure.
805	....do	Outside	46,000	92,200	Do.
806	....do	Radial	40,000	78,360	Do.
807	....do	....do	40,000	78,940	Do.
808	....do	Inside	52,000	88,140	Do.
809	....do	Outside	48,000	86,600	Do.
810	....do	Radial	44,000	85,140	Do.
811	....do	....do	44,000	85,820	Do.

No. 3861.

Marks, $\frac{12\,MC_1}{BT_2}TR$,
Length of stem, 24″.25.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000205	.000055	.000005	.000005	
6,000	6,000	.000275	.000070	.....	.....	
7,000	7,000	.000345	.000070	.....	.....	
8,000	8,000	.000405	.000060	.....	.....	
9,000	9,000	.000480	.000075	.....	.....	
10,000	10,000	.000550	.000070	.000040	.000035	
11,000	11,000	.000630	.000080	.....	.....	
12,000	12,000	.000715	.000085	.000060	.000020	
13,000	13,000	.000800	.000085	.....	.....	
14,000	14,000	.000900	.000100	.000100	.000040	
15,000	15,000	.001000	.000100	.....	.....	
16,000	16,000	.001105	.000105	.000150	.000050	
17,000	17,000	.001210	.000105	.....	.....	
18,000	18,000	.001400	.000190	.000215	.000065	
19,000	19,000	.001500	.000100	.....	.....	
20,000	20,000	.001660	.000160	.000365	.000150	
21,000	21,000	.001830	.000170	.....	.....	
22,000	22,000	.002065	.000235	.000565	.000200	
23,000	23,000	.002315	.000250	.....	.....	
24,000	24,000	.002585	.000270	.000870	.000305	
25,000	25,000	.002945	.000360	.001130	.000260	
28,020	28,020	.....	.....	.....	.....	Tensile strength.

Fractured 2½″ from the neck.
Appearance, uniform granular.

No. 3863.

Marks, $\frac{12\ M\ C_1\ T\ R_3}{B\ T_2}$
Length of stem, 23″.37.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000350	.000050	.....	.....	
9,000	9,000	.000400	.000050	.....	.....	
10,000	10,000	.000460	.000060	.000010	.000010	
11,000	11,000	.000520	.000060	.....	.....	
12,000	12,000	.000600	.000080	.000025	.000015	
13,000	13,000	.000655	.000055	.....	.....	
14,000	14,000	.000725	.000070	.000045	.000020	
15,000	15,000	.000790	.000065	.....	.....	
16,000	16,000	.000865	.000075	.000070	.000025	
17,000	17,000	.000950	.000085	.....	.....	
18,000	18,000	.001010	.000060	.000120	.000050	
19,000	19,000	.001120	.000110	.....	.....	
20,000	20,000	.001205	.000085	.000160	.000040	
21,000	21,000	.001315	.000110	.....	.....	
22,000	22,000	.001450	.000135	.000255	.000095	
23,000	23,000	.001580	.000130	.....	.....	
24,000	24,000	.001725	.000145	.000410	.000155	
25,000	25,000	.001895	.000170	.000505	.000095	
31,500	31,500	.....	.....	.....	.....	Stress applied and then released and micrometer observations made under lower loads.
1,000	1,000	.....	.....	.002435	.001930	
2,000	2,000	.002490	.000055	.....	.....	
4,000	4,000	.002600	.000110	.....	.....	
6,000	6,000	.002710	.000110	.....	.....	
8,000	8,000	.002835	.000125	.....	.....	
10,000	10,000	.002955	.000120	.....	.....	
12,000	12,000	.003085	.000130	.....	.....	
14,000	14,000	.003205	.000120	.....	.....	
16,000	16,000	.003335	.000130	.....	.....	
18,000	18,000	.003465	.000130	.....	.....	
20,000	20,000	.003605	.000140	.....	.....	
22,000	22,000	.003745	.000140	.....	.....	
24,000	24,000	.003885	.000140	.....	.....	
22,000	22,000	.003785	—.000100	.....	.....	
20,000	20,000	.003665	—.000110	.....	.....	
18,000	18,000	.003560	—.000105	.....	.....	
16,000	16,000	.003440	—.000120	.....	.....	
14,000	14,000	.003305	—.000135	.....	.....	
12,000	12,000	.003190	—.000115	.....	.....	
10,000	10,000	.003060	—.000130	.....	.....	
8,000	8,000	.002935	—.000125	.....	.....	
6,000	6,000	.002805	—.000130	.....	.....	
4,000	4,000	.002665	—.000140	.....	.....	
2,000	2,000	.002530	—.000135	.....	.....	
1,000	1,000	.....	.....	.102445	.000010	
20,000	20,000	.003610	.001165	.....	.....	
22,000	22,000	.003755	.000145	.....	.....	
24,000	24,000	.003890	.000135	.....	.....	
22,000	22,000	.003785	—.000105	.....	.....	
20,000	20,000	.003665	—.000120	.....	.....	
22,000	22,000	.003785	.000120	.....	.....	
24,000	24,000	.003890	.000105	.....	.....	
22,000	22,000	.003785	—.000105	.....	.....	
20,000	20,000	.003665	—.000120	.002455	.000010	
31,780	31,780	.....	.....	.....	.....	Tensile strength.
0	0	.....	.....	.00275	.....	

Fractured at the neck.
Appearance, uniform granular.

No. 793.

Marks, $\frac{12\,M\,C_1\,T\,R_2}{B\,R_{19}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00008	.00004	.....	.....	
4,000	4,000	.00014	.00006	.....	.....	
5,000	5,000	.00018	.00004	0.	.....	
6,000	6,000	.00022	.00004	.....	.....	
7,000	7,000	.00026	.00004	.....	.....	
8,000	8,000	.00030	.00004	.....	.....	
9,000	9,000	.00034	.00004	.....	.....	
10,000	10,000	.00040	.00006	0.	.....	
11,000	11,000	.00048	.00008	.....	.....	
12,000	12,000	.00054	.00006	.....	.....	
13,000	13,000	.00058	.00004	.....	.....	
14,000	14,000	.00064	.00006	.....	.....	
15,000	15,000	.00070	.00006	.00004	.00004	
16,000	16,000	.00074	.00004	.....	.....	
17,000	17,000	.00078	.00004	.....	.....	
18,000	18,000	.00082	.00004	.....	.....	
19,000	19,000	.00086	.00004	.....	.....	
20,000	20,000	.00094	.00008	.00006	.00002	
21,000	21,000	.00100	.00006	.....	.....	
22,000	22,000	.00106	.00006	.....	.....	
23,000	23,000	.00112	.00006	.....	.....	
24,000	24,000	.00120	.00008	.....	.....	
25,000	25,000	.00126	.00006	.00012	.00006	
26,000	26,000	.00132	.00006	.....	.....	
27,000	27,000	.00138	.00006	.....	.....	
28,000	28,000	.00146	.00008	.....	.....	
29,000	29,000	.00154	.00008	.....	.....	
30,000	30,000	.00166	.00012	.00024	.00012	
31,000	31,000	.00174	.00008	.....	.....	
32,000	32,000	.00182	.00008	.....	.....	
33,000	33,000	.00196	.00014	.....	.....	
34,000	34,000	.00212	.00016	.....	.....	
35,000	35,000	.00234	.00022	.00066	.00042	
36,000	36,000	.00256	.00022	.....	.....	
37,000	37,000	.00276	.00020	.....	.....	
38,000	38,000	.00302	.00026	.....	.....	
39,000	39,000	.00336	.00034	.....	.....	
40,000	40,000	.00370	.00034	.00174	.00108	
63,800	63,800	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

TENACITY SPECIMENS.

No. of test.	Numbers.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
	12 M C_1 T R_2	*Inches.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
3063	B T_3 I	1.129	1.00	28,220	28,220	Uniform granular.
3064	B T_4 O	1.129	1.00	30,730	30,730	Do.
3065	B T_5 M	1.129	1.00	29,010	29,010	Do.
	12 M C_1 T R_2					
3066	B T_3 I	1.129	1.00	31,840	31,840	Do.
3067	B T_4 O	1.129	1.00	31,610	31,610	Do.
3068	B T_5 M	1.129	1.00	33,430	33,430	Do.
3069	B L_6 I	1.129	1.00	34,480	34,480	Do.
3070	B L_7 O	1.129	1.00	31,170	31,170	Do.
3071	B L_8 M	1.129	1.00	33,390	33,390	Do.

No. 3827.

Marks, $^{12\ M\ R_2\ T\ B_1}_{M\ T_2}$
Length of stem, $23\frac{5}{8}$".
Diameter, 1".129.
Sectional area, 1 square inch.
Gauged length, 20".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000045	.000045	.....	.....	
3,000	3,000	.000095	.000050	.....	.....	
4,000	4,000	.000145	.000050	.....	.....	
5,000	5,000	.000195	.000050	0.	.....	
6,000	6,000	.000250	.000055	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000355	.000055	.....	.....	
9,000	9,000	.000410	.000055	.....	.....	
10,000	10,000	.000470	.000060	.000015	.000015	
11,000	11,000	.000525	.000055	.....	.....	
12,000	12,000	.000590	.000065	.000025	.000010	
13,000	13,000	.000645	.000055	.....	.....	
14,000	14,000	.000705	.000060	.000040	.000015	
15,000	15,000	.000780	.000075	.....	.....	
16,000	16,000	.000845	.000065	.000060	.000020	
17,000	17,000	.000910	.000065	.....	.....	
18,000	18,000	.000990	.000080	.000090	.000030	
19,000	19,000	.001065	.000075	.....	.....	
20,000	20,000	.001145	.000080	.000115	.000025	
21,000	21,000	.001240	.000095	.....	.....	
22,000	22,000	.001335	.000095	.000165	.000050	
23,000	23,000	.001435	.000100	.....	.....	
24,000	24,000	.001540	.000105	.000245	.000080	
25,000	25,000	.001685	.000145	.000310	.000065	
30,520	30,520	.....	.....	.....	.....	Tensile strength.

Fractured 2" from neck.
Appearance, uniform granular.
Specific gravity, 7.2586.
Hardness, 17.71.

No. 3829.

Marks, $\frac{12\,M\,R_3\,T\,R_2}{B\,T_2}$
Length of stem, $24\frac{5}{16}$".
Diameter, 1".129.
Sectional area, 1 square inch.
Gauged length, 20".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000100	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000255	.000055	.....	.....	
7,000	7,000	.000310	.000055	.....	.....	
8,000	8,000	.000370	.000060	.....	.....	
9,000	9,000	.000430	.000060	.....	.....	
10,000	10,000	.000485	.000055	.000015	.000015	
11,000	11,000	.000545	.000060	.....	.....	
12,000	12,000	.000605	.000060	.000035	.000020	
13,000	13,000	.000675	.000070	.....	.....	
14,000	14,000	.000740	.000065	.000045	.000010	
15,000	15,000	.000800	.000060	.....	.....	
16,000	16,000	.000860	.000060	.000045	0.	
17,000	17,000	.000910	.000050	.....	.....	
18,000	18,000	.000960	.000050	.000045	0.	
19,000	19,000	.001050	.000090	.....	.....	
20,000	20,000	.001150	.000100	.000085	.000040	
21,000	21,000	.001255	.000105	.....	.....	
22,000	22,000	.001365	.000110	.000155	.000070	
23,000	23,000	.001500	.000135	.....	.....	
24,000	24,000	.001645	.000145	.000285	.000130	
25,000	25,000	.001835	.000190	.000390	.000105	
30,570	30,570	.....	.....	.....	.....	Tensile strength.

Fractured at middle of stem.
Appearance, uniform granular.

No. 782.

Marks, $^{12\ M\ R_2\ T\ R_2}_{B\ T_{10}}$
Length, $10\frac{5}{8}$".
Diameter, 1".129.
Sectional area, 1 square inch.
Gauged length, 5".

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00028	.00004	.....	.....	
8,000	8,000	.00034	.00006	.....	.....	
9,000	9,000	.00040	.00006	.....	.....	
10,000	10,000	.00044	.00004	.00004	.00004	
11,000	11,000	.00050	.00006	.....	.....	
12,000	12,000	.00054	.00004	.....	.....	
13,000	13,000	.00060	.00006	.....	.....	
14,000	14,000	.00066	.00006	.....	.....	
15,000	15,000	.00070	.00004	.00006	.00002	
16,000	16,000	.00074	.00004	.....	.....	
17,000	17,000	.00080	.00006	.....	.....	
18,000	18,000	.00082	.00002	.....	.....	
19,000	19,000	.00088	.00006	.....	.....	
20,000	20,000	.00094	.00006	.00010	.00004	
21,000	21,000	.00098	.00004	.....	.....	
22,000	22,000	.00102	.00004	.....	.....	
23,000	23,000	.00106	.00004	.....	.....	
24,000	24,000	.00110	.00004	.....	.....	
25,000	25,000	.00118	.00008	.00012	.00002	
26,000	26,000	.00126	.00008	.....	.....	
27,000	27,000	.00134	.00008	.....	.....	
28,000	28,000	.00144	.00010	.....	.....	
29,000	29,000	.00152	.00008	.....	.....	
30,000	30,000	.00160	.00008	.00024	.00012	
31,000	31,000	.00170	.00010	.....	.....	
32,000	32,000	.00176	.00006	.....	.....	
33,000	33,000	.00190	.00014	.....	.....	
34,000	34,000	.00200	.00010	.....	.....	
35,000	35,000	.00214	.00014	.00050	.00026	
36,000	36,000	.00232	.00018	.....	.....	
37,000	37,000	.00242	.00010	.....	.....	
38,000	38,000	.00256	.00014	.....	.....	
39,000	39,000	.00276	.00020	.....	.....	
40,000	40,000	.00308	.00032	.00112	.00062	
60,180	60,180	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 4.

No. 3830.

Marks, $\frac{12\ M\ R_1\ T\ B_2}{M\ T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050			
3,000	3,000	.000100	.000050			
4,000	4,000	.000150	.000050			
5,000	5,000	.000200	.000050	0.		
6,000	6,000	.000250	.000050			
7,000	7,000	.000310	.000060			
8,000	8,000	.000365	.000055			
9,000	9,000	.000430	.000065			
10,000	10,000	.000490	.000060	.000015	.000015	
11,000	11,000	.000545	.000055			
12,000	12,000	.000605	.000060	.000025	.000010	
13,000	13,000	.000670	.000065			
14,000	14,000	.000735	.000065	.000045	.000020	
15,000	15,000	.000805	.000070			
16,000	16,000	.000870	.000065	.000060	.000015	
17,000	17,000	.000945	.000075			
18,000	18,000	.001010	.000065	.000080	.000020	
19,000	19,000	.001090	.000080			
20,000	20,000	.001170	.000080	.000110	.000030	
21,000	21,000	.001255	.000085			
22,000	22,000	.001345	.000090	.000145	.000035	
23,000	23,000	.001440	.000095			
24,000	24,000	.001545	.000105	.000210	.000065	
25,000	25,000	.001650	.000105	.000250	.000040	
32,610						Tensile strength.

Fractured 2″ from neck.
Appearance, uniform granular.

No. 3833.

Marks, $\frac{12\ M\ R_1\ T\ R_2}{B\ T_2}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000110	.000055	.....	.....	
4,000	4,000	.000175	.000065	.....	.....	
5,000	5,000	.000225	.000050	.000005	.000005	
6,000	6,000	.000280	.000055	.....	.....	
7,000	7,000	.000340	.000060	.....	.....	
8,000	8,000	.000400	.000060	.....	.....	
9,000	9,000	.000455	.000055	.....	.....	
10,000	10,000	.000525	.000070	.000035	.000030	
11,000	11,000	.000585	.000060	.....	.....	
12,000	12,000	.000640	.000055	.000050	.000015	
13,000	13,000	.000720	.000080	.....	.....	
14,000	14,000	.000800	.000080	.000070	.000020	
15,000	15,000	.000875	.000075	.....	.....	
16,000	16,000	.000955	.000080	.000095	.000025	
17,000	17,000	.001060	.000105	.....	.....	
18,000	18,000	.001145	.000085	.000150	.000055	
19,000	19,000	.001240	.000095	.....	.....	
20,000	20,000	.001355	.000105	.000210	.000060	
21,000	21,000	.001485	.000130	.....	.....	
22,000	22,000	.001630	.000145	.000335	.000125	
23,000	23,000	.001795	.000165	.....	.....	
24,000	24,000	.001960	.000165	.000505	.000170	
25,000	25,000	.002230	.000270	.000670	.000165	
28,080	28,080	.....	.....	.....	.....	Tensile strength.

Fractured 4″.50 from neck.
Appearance, granular, in part dark mottled.

No. 783.

R_1 T R_2
B T,
″
1″.129.
rea, 1 square inch.
gth, 10″.

s. uare .	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
ds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
000	0.	0.	0.	0.	Initial load.
000	.00005	.00005	.....	.....	
000	.00009	.00004	.....	.....	
000	.00014	.00005	.....	.....	
000	.00021	.00007	0.	.....	
000	.00027	.00006	.....	.....	
000	.00032	.00005	.....	.....	
000	.00038	.00006	.....	.....	
000	.00043	.00005	.....	.....	
000	.00049	.00006	.00003	.00003	
000	.00056	.00007	.....	.....	
000	.00062	.00006	.....	.....	
000	.00068	.00006	.....	.....	
000	.00073	.00005	.....	.....	
000	.00080	.00007	.00008	.00005	
000	.00086	.00006	.....	.....	
000	.00092	.00006	.....	.....	
000	.00099	.00007	.....	.....	
000	.00105	.00006	.....	.....	
000	.00111	.00006	.00013	.00005	
000	.00119	.00008	.....	.....	
000	.00126	.00007	.....	.....	
000	.00132	.00006	.....	.....	
000	.00139	.00007	.....	.....	
000	.00147	.00008	.00021	.00005	
000	.00154	.00006	.....	.....	
000	.00162	.00009	.....	.....	
000	.00171	.00009	.....	.....	
000	.00179	.00008	.....	.....	
000	.00192	.00013	.00038	.00017	
000	.00202	.00010	.....	.....	
000	.00212	.00010	.....	.....	
000	.00222	.00010	.....	.....	
000	.00239	.00017	.....	.....	
000	.00257	.00018	.00077	.00039	
000	.00280	.00023	.....	.....	
000	.00295	.00015	.....	.....	
000	.00318	.00023	.....	.....	
000	.00347	.00029	.....	.....	
000	.00380	.00033	.00169	.00092	
20	.....	.....	.....	.....	Ultimate strength.

riple flexure.

No. 784.

Marks, $\frac{12\ M\ R_1\ T\ R_2}{B\ T_{10}}$
Length, $10\frac{5}{8}''$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00020	.00006	.00002	.00002	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00042	.00006	.....	.....	
10,000	10,000	.00048	.00006	.00002	0.	
11,000	11,000	.00052	.00004	.....	.....	
12,000	12,000	.00056	.00004	.....	.....	
13,000	13,000	.00064	.00008	.....	.....	
14,000	14,000	.00070	.00006	.....	.....	
15,000	15,000	.00076	.00006	.00004	.00002	
16,000	16,000	.00080	.00004	.....	.....	
17,000	17,000	.00088	.00008	.....	.....	
18,000	18,000	.00094	.00006	.....	.....	
19,000	19,000	.00100	.00006	.....	.....	
20,000	20,000	.00104	.00004	.00010	.00006	
21,000	21,000	.00110	.00006	.....	.....	
22,000	22,000	.00116	.00006	.....	.....	
23,000	23,000	.00124	.00008	.....	.....	
24,000	24,000	.00134	.00010	.....	.....	
25,000	25,000	.00140	.00006	.00020	.00010	
26,000	26,000	.00150	.00010	.....	.....	
27,000	27,000	.00160	.00010	.....	.....	
28,000	28,000	.00168	.00008	.....	.....	
29,000	29,000	.00176	.00008	.....	.....	
30,000	30,000	.00190	.00014	.00034	.00014	
31,000	31,000	.00200	.00010	.....	.....	
32,000	32,000	.00210	.00010	.....	.....	
33,000	33,000	.00226	.00016	.....	.....	
34,000	34,000	.00238	.00012	.....	.....	
35,000	35,000	.00256	.00018	.00076	.00042	
36,000	36,000	.00278	.00022	.....	.....	
37,000	37,000	.00294	.00016	.....	.....	
38,000	38,000	.00320	.00026	.....	.....	
39,000	39,000	.00348	.00028	.....	.....	
40,000	40,000	.00386	.00038	.00172	.00096	
58,600	58,600	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 5.

No. 3834.

B M B, T B,
M T,
of stem, 27½″.
r, 1″.128.
l area, 1 square inch.
ength, 20″.

ds. / quare h.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
	Inch.	*Inch.*	*Inch.*	*Inch.*	
ts.	0.	0.	0.	0.	Initial load.
00	.000050	.000050			
00	.000100	.000050			
00	.000150	.000050			
0	.000205	.000055	.000005	.000005	
0	.000260	.000055			
0	.000320	.000060			
0	.000380	.000060			
0	.000435	.000055			
0	.000500	.000065	.000035	.000030	
0	.000550	.000050			
0	.000610	.000060	.000040	.000005	
0	.000680	.000070			
0	.000740	.000060	.000050	.000010	
0	.000800	.000060			
0	.000875	.000075	.000085	.000035	
0	.000940	.000065			
0	.001010	.000070	.000100	.000015	
0	.001090	.000080			
0	.001170	.000080	.000140	.000040	
0	.001255	.000085			
0	.001350	.000095	.000185	.000045	
0	.001445	.000095			
0	.001545	.000100	.000245	.000060	
0	.001665	.000120	.000290	.000045	
10					Tensile strength.

″50 from neck.
e, granular, in part dark mottled.

No. 3835.

Marks, $\frac{12\ M\ R_2\ T\ R_1}{M\ T_2}$
Length of stem, 275/8".
Diameter, 1".128.
Sectional area, 1 square inch.
Gauged length, 20".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000105	.000055	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000205	.000050	.000005	.000005	
6,000	6,000	.000255	.000050	.....	.....	
7,000	7,000	.000315	.000060	.....	.....	
8,000	8,000	.000375	.000060	.....	.....	
9,000	9,000	.000430	.000055	.....	.....	
10,000	10,000	.000485	.000055	.000015	.000010	
11,000	11,000	.000540	.000055	.....	.....	
12,000	12,000	.000600	.000060	.000030	.000015	
13,000	13,000	.000660	.000060	.....	.....	
14,000	14,000	.000730	.000070	.000045	.000015	
15,000	15,000	.000795	.000065	.....	.....	
16,000	16,000	.000860	.000065	.000070	.000025	
17,000	17,000	.000935	.000075	.....	.....	
18,000	18,000	.001010	.000075	.000090	.000020	
19,000	19,000	.001090	.000080	.....	.....	
20,000	20,000	.001165	.000075	.000130	.000040	
21,000	21,000	.001255	.000090	.....	.....	
22,000	22,000	.001345	.000090	.000170	.000040	
23,000	23,000	.001445	.000100	.....	.....	
24,000	24,000	.001550	.000105	.000245	.000075	
25,000	25,000	.001675	.000125	.000290	.000045	
29,420	29,420	.....	.....	.....	.....	Tensile strength.

Fractured 10" from neck.
Appearance, granular with dark spangles.

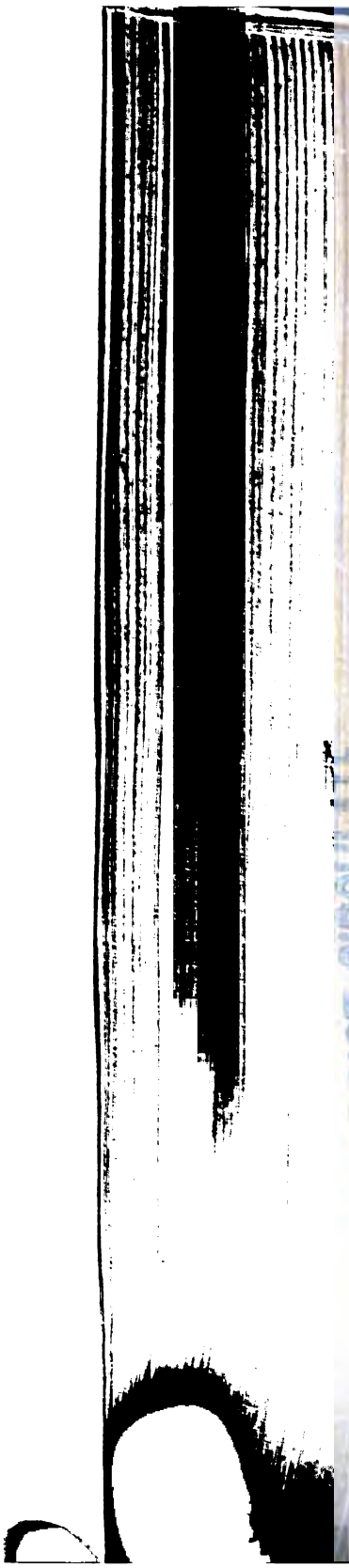
No. 3836.

15 M R, T R,
B T,

h of stem, 27⅝″.
ter, 1″.128.
nal area, 1 square inch.
d length, 20″.

l loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	0.	0.	0.	0.	Initial load.
2, 000	.000050	.000050			
3, 000	.000100	.000050			
4, 000	.000150	.000050			
5, 000	.000205	.000055	0.		
6, 000	.000255	.000050			
7, 000	.000315	.000060			
8, 000	.000375	.000060			
9, 000	.000435	.000060			
10, 000	.000495	.000060	.000015	.000015	
11, 000	.000555	.000060			
12, 000	.000620	.000065	.000035	.000020	
13, 000	.000685	.000065			
14, 000	.000755	.000070	.000055	.000020	
15, 000	.000825	.000070			
16, 000	.000890	.000065	.000070	.000015	
17, 000	.000945	.000055			
18, 000	.001000	.000055	.000090	.000020	
19, 000	.001075	.000075			
20, 000	.001170	.000095	.000115	.000025	
21, 000	.001270	.000100			
22, 000	.001395	.000125	.000185	.000070	
23, 000	.001540	.000145			
24, 000	.001705	.000165	.000340	.000155	
25, 000	.001890	.000185	.000435	.000095	
28, 890	----------	----------	----------	----------	Tensile strength.

ed 11″ from neck.
ance, uniform granular.



No. 3837.

Marks, $\frac{12\ M\ R_2\ T\ R_2}{B\ T_2}$
Length of stem, $27\frac{5}{8}$".
Diameter, 1".128.
Sectional area, 1 square inch.
Gauged length, 20".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000105	.000055	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000210	.000055	0.	.....	
6,000	6,000	.000265	.000055	.....	.....	
7,000	7,000	.000330	.000065	.....	.....	
8,000	8,000	.000385	.000055	.....	.....	
9,000	9,000	.000450	.000065	.....	.....	
10,000	10,000	.000505	.000055	.000025	.000025	
11,000	11,000	.000560	.000055	.....	.....	
12,000	12,000	.000630	.000060	.000045	.000020	
13,000	13,000	.000695	.000065	.....	.....	
14,000	14,000	.000755	.000060	.000055	.000010	
15,000	15,000	.000835	.000080	.....	.....	
16,000	16,000	.000905	.000070	.000085	.000030	
17,000	17,000	.000990	.000085	.....	.....	
18,000	18,000	.001065	.000075	.000115	.000030	
19,000	19,000	.001155	.000090	.....	.....	
20,000	20,000	.001255	.000100	.000170	.000055	
21,000	21,000	.001360	.000105	.....	.....	
22,000	22,000	.001495	.000135	.000260	.000090	
23,000	23,000	.001610	.000115	.....	.....	
24,000	24,000	.001760	.000150	.000390	.000130	
25,000	25,000	.001945	.000185	.000495	.000105	
29,976	29,970	.....	.....	.....	.....	Tensile strength.

Fractured 10" from neck.
Appearance, uniform granular.

No. 785.

arks, $\frac{12\text{ M }R_2\text{ T }R_2}{B\text{ T}_2}$
ngth, 12″.
ameter, 1″.129.
tional area, 1 square inch.
nged length, 10″.

plied loads. Per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	0.	0.	0.	0.	Initial load.
1, 000	.00006	.00006			
2, 000	.00012	.00006			
3, 000	.00017	.00005			
4, 000	.00022	.00005	.00001	.00001	
5, 000	.00027	.00005			
6, 000	.00032	.00005			
7, 000	.00037	.00005			
8, 000	.00042	.00005			
9, 000	.00048	.00006	.00002	.00001	
10, 000	.00053	.00005			
11, 000	.00060	.00007			
12, 000	.00066	.00006			
13, 000	.00071	.00005			
14, 000	.00077	.00006	.00003	.00001	
15, 000	.00082	.00005			
16, 000	.00088	.00006			
17, 000	.00095	.00007			
18, 000	.00100	.00005			
19, 000	.00108	.00008	.00011	.00008	
20, 000	.00112	.00004			
21, 000	.00120	.00008			
22, 000	.00127	.00007			
23, 000	.00132	.00005			
24, 000	.00140	.00008	.00019	.00008	
25, 000	.00148	.00008			
26, 000	.00153	.00005			
27, 000	.00162	.00009			
28, 000	.00169	.00007			
29, 000	.00178	.00009	.00031	.00012	
30, 000	.00190	.00012			
31, 000	.00201	.00011			
32, 000	.00212	.00011			
33, 000	.00228	.00016			
34, 000	.00243	.00015	.00068	.00037	
35, 000	.00258	.00015			
36, 000	.00272	.00014			
37, 000	.00292	.00020			
38, 000	.00322	.00030			
39, 000	.00352	.00030	.00148	.00080	
40, 000					Ultimate strength.
54, 960					

led by triple flexure.

No. 786.

Marks, $\frac{12\ M\ R_5\ T\ R_3}{B\ R_{10}}$
Length, 10′.69.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	.00002	.00002	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00034	.00004	.....	.....	
9,000	9,000	.00040	.00006	.....	.....	
10,000	10,000	.00044	.00004	.00004	.00002	
11,000	11,000	.00050	.00006	.....	.....	
12,000	12,000	.00056	.00006	.....	.....	
13,000	13,000	.00060	.00004	.....	.....	
14,000	14,000	.00066	.00006	.....	.....	
15,000	15,000	.00072	.00006	.00006	.00002	
16,000	16,000	.00078	.00006	.....	.....	
17,000	17,000	.00082	.00004	.....	.....	
18,000	18,000	.00088	.00006	.....	.....	
19,000	19,000	.00094	.00006	.....	.....	
20,000	20,000	.00100	.00006	.00010	.00004	
21,000	21,000	.00106	.00006	.....	.....	
22,000	22,000	.00112	.00006	.....	.....	
23,000	23,000	.00118	.00006	.....	.....	
24,000	24,000	.00124	.00006	.....	.....	
25,000	25,000	.00132	.00008	.00016	.00006	
26,000	26,000	.00140	.00008	.....	.....	
27,000	27,000	.00146	.00006	.....	.....	
28,000	28,000	.00152	.00006	.....	.....	
29,000	29,000	.00160	.00008	.....	.....	
30,000	30,000	.00170	.00010	.00026	.00010	
31,000	31,000	.00180	.00010	.....	.....	
32,000	32,000	.00190	.00010	.....	.....	
33,000	33,000	.00202	.00012	.....	.....	
34,000	34,000	.00216	.00014	.....	.....	
35,000	35,000	.00230	.00014	.00060	.00034	
36,000	36,000	.00246	.00016	.....	.....	
37,000	37,000	.00264	.00018	.....	.....	
38,000	38,000	.00280	.00016	.....	.....	
39,000	39,000	.00302	.00022	.....	.....	
40,000	40,000	.00336	.00034	.00134	.00074	
61,940	61,940	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 3883.

Marks, $\frac{12\,M\,R_1\,T\,R_2}{M\,T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation. per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000060	.000060	.....	.....	
3,000	3,000	.000110	.000050	.....	.....	
4,000	4,000	.000150	.000040	.....	.....	
5,000	5,000	.000210	.000060	.000010	.000010	
6,000	6,000	.000260	.000050	.....	.....	
7,000	7,000	.000315	.000055	.....	.....	
8,000	8,000	.000365	.000050	.....	.....	
9,000	9,000	.000425	.000060	.....	.....	
10,000	10,000	.000485	.000060	.000025	.000015	
11,000	11,000	.000550	.000065	.....	.....	
12,000	12,000	.000600	.000050	.000035	.000010	
13,000	13,000	.000660	.000060	.....	.....	
14,000	14,000	.000715	.000055	.000060	.000025	
15,000	15,000	.000780	.000065	.....	.....	
16,000	16,000	.000850	.000070	.000060	0.	
17,000	17,000	.000915	.000065	.....	.....	
18,000	18,000	.000990	.000075	.000075	.000015	
19,000	19,000	.001060	.000070	.....	.....	
20,000	20,000	.001135	.000075	.000105	.000030	
21,000	21,000	.001210	.000075	.....	.....	
22,000	22,000	.001300	.000090	.000150	.000045	
23,000	23,000	.001395	.000095	.....	.....	
24,000	24,000	.001495	.000100	.000210	.000060	
25,000	25,000	.001605	.000110	.000245	.000035	
29,810	29,810	.....	.....	.....	.....	Tensile strength.

Fractured $\frac{7}{8}$″ from neck.
Appearance, granular; light-colored metal interspersed with dark spots.

No. 788.

Marks, $\overset{12\ M\ R_1\ T\ R_2}{B\ T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00021	.00005	0.	.....	
6,000	6,000	.00025	.00004	.....	.....	
7,000	7,000	.00030	.00005	.....	.....	
8,000	8,000	.00035	.00005	.....	.....	
9,000	9,000	.00040	.00005	.....	.....	
10,000	10,000	.00046	.00006	.00001	.00001	
11,000	11,000	.00051	.00005	.....	.....	
12,000	12,000	.00057	.00006	.....	.....	
13,000	13,000	.00062	.00005	.....	.....	
14,000	14,000	.00068	.00006	.....	.....	
15,000	15,000	.00074	.00006	.00007	.00006	
16,000	16,000	.00080	.00006	.....	.....	
17,000	17,000	.00085	.00005	.....	.....	
18,000	18,000	.00091	.00006	.....	.....	
19,000	19,000	.00098	.00007	.....	.....	
20,000	20,000	.00105	.00007	.00010	.00003	
21,000	21,000	.00110	.00005	.....	.....	
22,000	22,000	.00118	.00008	.....	.....	
23,000	23,000	.00124	.00006	.....	.....	
24,000	24,000	.00130	.00006	.....	.....	
25,000	25,000	.00137	.00007	.00018	.00008	
26,000	26,000	.00142	.00005	.....	.....	
27,000	27,000	.00149	.00007	.....	.....	
28,000	28,000	.00157	.00008	.....	.....	
29,000	29,000	.00167	.00010	.....	.....	
30,000	30,000	.00177	.00010	.00028	.00010	
31,000	31,000	.00187	.00010	.....	.....	
32,000	32,000	.00196	.00009	.....	.....	
33,000	33,000	.00205	.00009	.....	.....	
34,000	34,000	.00218	.00013	.....	.....	
35,000	35,000	.00229	.00011	.00056	.00028	
36,000	36,000	.00248	.00019	.....	.....	
37,000	37,000	.00277	.00029	.....	.....	
38,000	38,000	.00290	.00013	.....	.....	
39,000	38,000	.00308	.00018	.....	.....	
40,000	40,000	.00340	.00032	.00140	.00084	
56,150	56,150	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, NO. 7.

No. 3843.

Marks, $\frac{12\ M\ R_7\ T\ R_1}{M\ T_1}$
Length of stem, $23\frac{3}{4}''$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000095	.000045	.....	.....	
4,000	4,000	.000140	.000045	.....	.....	
5,000	5,000	.000190	.000050	.....	.....	
6,000	6,000	.000245	.000055	.....	.....	
7,000	7,000	.000295	.000050	.....	.....	
8,000	8,000	.000350	.000055	.....	.....	
9,000	9,000	.000400	.000050	.....	.....	
10,000	10,000	.000455	.000055	.000010	.000010	
11,000	11,000	.000510	.000055	.....	.....	
12,000	12,000	.000570	.000060	.000015	.000005	
13,000	13,000	.000635	.000065	.....	.....	
14,000	14,000	.000695	.000060	.000040	.000025	
15,000	15,000	.000755	.000060	.....	.....	
16,000	16,000	.000815	.000060	.000060	.000020	
17,000	17,000	.000895	.000080	.....	.....	
18,000	18,000	.000960	.000065	.000090	.000030	
19,000	19,000	.001045	.000085	.....	.....	
20,000	20,000	.001115	.000070	.000125	.000035	
21,000	21,000	.001205	.000090	.....	.....	
22,000	22,000	.001300	.000095	.000170	.000045	
23,000	23,000	.001400	.000100	.....	.....	
24,000	24,000	.001505	.000105	.000250	.000080	
25,000	25,000	.001625	.000120	.000300	.000050	
31,380	31,380	.....	.....	.....	.....	Tensile strength.

Fractured 1″.50 from neck.
Appearance, uniform granular.

No. 787.

Marks, $\frac{12\ M\ R_2\ T\ R_2}{B\ T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	.....	.....	
3,000	3,000	.00012	.00005	.....	.....	
4,000	4,000	.00017	.00005	.....	.....	
5,000	5,000	.00022	.00005	0.	.....	
6,000	6,000	.00027	.00005	.....	.....	
7,000	7,000	.00030	.00003	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00041	.00005	.....	.....	
10,000	10,000	.00047	.00006	.00002	.00002	
11,000	11,000	.00051	.00004	.....	.....	
12,000	12,000	.00056	.00005	.....	.....	
13,000	13,000	.00061	.00005	.....	.....	
14,000	14,000	.00067	.00006	.....	.....	
15,000	15,000	.00073	.00006	.00006	.00004	
16,000	16,000	.00079	.00006	.....	.....	
17,000	17,000	.00085	.00006	.....	.....	
18,000	18,000	.00091	.00006	.....	.....	
19,000	19,000	.00097	.00006	.....	.....	
20,000	20,000	.00102	.00005	.00010	.00004	
21,000	21,000	.00110	.00008	.....	.....	
22,000	22,000	.00115	.00005	.....	.....	
23,000	23,000	.00120	.00005	.....	.....	
24,000	24,000	.00126	.00006	.....	.....	
25,000	25,000	.00135	.00009	.00016	.00006	
26,000	26,000	.00143	.00008	.....	.....	
27,000	27,000	.00150	.00007	.....	.....	
28,000	28,000	.00157	.00007	.....	.....	
29,000	29,000	.00166	.00009	.....	.....	
30,000	30,000	.00172	.00006	.00026	.00010	
31,000	31,000	.00183	.00011	.....	.....	
32,000	32,000	.00193	.00010	.....	.....	
33,000	33,000	.00204	.00011	.....	.....	
34,000	34,000	.00215	.00011	.....	.....	
35,000	35,000	.00226	.00011	.00055	.00029	
36,000	36,000	.00244	.00018	.....	.....	
37,000	37,000	.00261	.00017	.....	.....	
38,000	38,000	.00280	.00019	.....	.....	
39,000	39,000	.00298	.00018	.....	.....	
40,000	40,000	.00326	.00028	.00125	.00070	
57,280	57,280	.....	.....	.....	.....	Ultimate strengt

Failed by triple flexure.

CAST-IRON BODY, No. 8.

No. 3858.

ks, $^{12\ M\ R,\ T\ R;}_{M\ T;\ M}$
gth of stem, 23″.
meter, 1″.129.
tional area, 1 square inch.
ged length, 20″.

pplied loads. Per square inch.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	0.	0.	0.	0,	Initial load.
2,000	.000050	.000050			
3,000	.000100	.000050			
4,000	.000150	.000050			
5,000	.000200	.000050	0.		
6,000	.000250	.000050			
7,000	.000310	.000060			
8,000	.000365	.000055			
9,000	.000415	.000050			
10,000	.000475	.000060	.000025	.000025	
11,000	.000535	.000060			
12,000	.000610	.000075	.000035	.000010	
13,000	.000660	.000050			
14,000	.000710	.000050	.000050	.000015	
15,000	.000780	.000070			
16,000	.000865	.000085	.000080	.000030	
17,000	.000935	.000070			
18,000	.001010	.000075	.000115	.000035	
19,000	.001085	.000075			
20,000	.001185	.000100	.000160	.000045	
21,000	.001285	.000100			
22,000	.001405	.000120	.000240	.000080	
22,000	.001525	.000120			
24,000	.001675	.000150	.000380	.000140	
25,000	.001840	.000165	.000480	.000100	
31,070	----------	----------	----------	----------	Tensile strength.

ed 2″ from neck.
ance, granular, in part dark mottled.
e gravity, 7.2781.
ess, 17.17.

DATA NOT ORIGINAL

11-INCH B. L. RIFLED MORTARS.

No. 3859.

Marks, ^{12} M R T R$_2$ / B T$_1$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000040	.000040	.....	.....	
3,000	3,000	.000090	.000050	.....	.....	
4,000	4,000	.000140	.000050	0.	.....	
5,000	5,000	.000190	.000050	.....	.....	
6,000	6,000	.000240	.000050	.....	.....	
7,000	7,000	.000295	.000055	.....	.....	
8,000	8,000	.000350	.000055	.....	.....	
9,000	9,000	.000405	.000055	.0.0010	.000010	
10,000	10,000	.000465	.000060	.....	.....	
11,000	11,000	.000515	.000050	.000015	.000005	
12,000	12,000	.000575	.000060	.....	.....	
13,000	13,000	.000635	.000060	.000035	.00002)	
14,000	14,000	.000710	.000075	.....	.....	
15,000	15,000	.000775	.000065	.000060	.000025	
16,000	16,000	.000850	.000075	.....	.....	
17,000	17,000	.000935	.000085	.000105	.000045	
18,000	18,000	.001005	.000070	.....	.....	
19,000	19,000	.001085	.000080	.000100	.000055	
20,000	20,000	.001190	.000105	.....	.....	
21,000	21,000	.001305	.000115	.000155	.000095	
22,000	22,000	.001410	.000105	.....	.....	
23,000	23,000	.001555	.000145	.000395	.000140	
24,000	24,000	.001705	.000250	.000510	.000113	Tensile str
25,000	25,000	.001900	.000195	.....	.....	
28,300	28,300	.....	.....	.....	.....	

Fractured 11″ from neck.
Appearance, uniform granular.

No. 789.

rks, $\frac{12\,M\,B_2\,T\,R_1}{B\,T_2}$
gth, 12″.
neter, 1″.129.
onal area, 1 square inch.

ul loads. Per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	Inch.	Inch.	Inch.	Inch.	
1,000	0.	0.	0.	0.	Initial load.
2,000	.00003	.00003			
3,000	.00010	.00007			
4,000	.00013	.00003			
5,000	.00018	.00005	0.		
6,000	.00023	.00005			
7,000	.00028	.00005			
8,000	.00033	.00005			
9,000	.00038	.00005			
10,000	.00043	.00005	.00002	.00002	
11,000	.00049	.00006			
12,000	.00054	.00005			
13,000	.00059	.00005			
14,000	.00065	.00006			
15,000	.00070	.00005	.00007	.00005	
16,000	.00076	.00006			
17,000	.00081	.00005			
18,000	.00087	.00006			
19,000	.00092	.00005			
20,000	.00098	.00006	.00010	.00003	
21,000	.00106	.00008			
22,000	.00112	.00006			
23,000	.00119	.00007			
24,000	.00124	.00005			
25,000	.00132	.00008	.00017	.00007	
26,000	.00140	.00008			
27,000	.00147	.00007			
28,000	.00153	.00006			
29,000	.00162	.00009			
30,000	.00176	.00014	.00032	.00015	
31,000	.00187	.00011			
32,000	.00197	.00010			
33,000	.00212	.00015			
34,000	.00226	.00014			
35,000	.00243	.00017	.00075	.00043	
36,000	.00263	.00020			
37,000	.00283	.00020			
38,000	.00310	.00027			
39,000	.00340	.00030			
40,000	.00368	.00028	.00182	.00107	
55,260					Ultimate strength.

by triple flexure.

CAST-IRON BODY, No. 9.

No. 3909.

Marks, $^{12\ M\ R_2\ T\ R_1}_{M\ T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.
Length of stem, 23″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	.0	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000105	.000055	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000205	.000050	.000005	.000005	
6,000	6,000	.000260	.000055	.....	.....	
7,000	7,000	.000315	.000055	.....	.....	
8,000	8,000	.000380	.000065	.....	.....	
9,000	9,000	.000435	.000055	.....	.....	
10,000	10,000	.000495	.000060	.000035	.000030	
11,000	11,000	.000555	.000060	.....	.....	
12,000	12,000	.000630	.000075	.000045	.000010	
13,000	13,000	.000690	.000060	.....	.....	
14,000	14,000	.000765	.000075	.000080	.000035	
15,000	15,000	.000830	.000065	.....	.....	
16,000	16,000	.000900	.000070	.000105	.000025	
17,000	17,000	.000985	.000085	.....	.....	
18,000	18,000	.001055	.000070	.000150	.000045	
19,000	19,000	.001150	.000095	.....	.....	
20,000	20,000	.001250	.000100	.000215	.000065	
21,000	21,000	.001355	.000105	.....	.....	
22,000	22,000	.001470	.000115	.000305	.000090	
23,000	23,000	.001635	.000165	.....	.....	
24,000	24,000	.001770	.000135	.000445	.000140	
25,000	25,000	.001985	.000215	.000560	.000115	
30,710	30,710	.....	.....	.....	.....	Tensile strength.

Fractured 5¼″ from neck.
Appearance, uniform granular.
Specific gravity, 7.2811.
Hardness, 17.08.

No. 3910.

M B, T B,
B T,
, 1″.275.
area, .989 square inch.
ength, 20″..
stem, 23″.

ds.	Elongation per inch-	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
quare ch.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
nds.	0	0.	0.	0.	Initial load.
, 000	.000050	.000050			
, 000	.000095	.000045			
, 000	.000140	.000045			
, 000	.000195	.000055	0.		
, 000	.000245	.000050			
000	.000290	.000045			
, 000	.000340	.000050			
, 000	.000400	.000060			
000	.000450	.000050	.000015	.000015	
, 000	.000505	.000055			
, 000	.000555	.000050	.000015	0.	
, 000	.000625	.000070			
, 000	.000685	.000060	.000035	.000020	
, 000	.000750	.000065			
, 000	.000805	.000055	.000055	.000020	
, 000	.000875	.000070			
, 000	.000935	.000060	.000065	.000010	
, 000	.001000	.000065			
, 000	.001070	.000070	.000100	.000035	
, 000	.001145	.000075			
, 000	.001205	.000060	.000135	.000035	
, 000	.001300	.000095			
, 000	.001390	.000090	.000165	.000030	
, 000	.001490	.000100	.000205	.000040	
, 980					Tensile strength.

ed 1″ from neck.
ance, uniform granular.
gravity, 7.2839.
ss, 16.90.

No. 821.

Marks, $^{12\,M\,R_2\,T\,R_2}_{B\,T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00002	.00002	.....	.....	
3,000	3,000	.00008	.00006	.....	.....	
4,000	4,000	.00012	.00004	.....	.....	
5,000	5,000	.00018	.00006	0.	.....	
6,000	6,000	.00022	.00004	.....	.....	
7,000	7,000	.00028	.00006	.....	.....	
8,000	8,000	.00033	.00005	.....	.....	
9,000	9,000	.00039	.00006	.....	.....	
10,000	10,000	.00043	.00004	0.	.....	
11,000	11,000	.00050	.00007	.....	.....	
12,000	12,000	.00057	.00007	.....	.....	
13,000	13,000	.00061	.00004	.....	.....	
14,000	14,000	.00068	.00007	.....	.....	
15,000	15,000	.00072	.00004	.00004	.00004	
16,000	16,000	.00080	.00008	.....	.....	
17,000	17,000	.00086	.00006	.....	.....	
18,000	18,000	.00092	.00006	.....	.....	
19,000	19,000	.00098	.00006	.....	.....	
20,000	20,000	.00104	.00006	.00010	.00006	
21,000	21,000	.00111	.00007	.....	.....	
22,000	22,000	.00117	.00006	.....	.....	
23,000	23,000	.00112	.00005	.....	.....	
24,000	24,000	.00130	.00008	.....	.....	
25,000	25,000	.00137	.00007	.00017	.00007	
26,000	26,000	.00144	.00007	.....	.....	
27,000	27,000	.00151	.00007	.....	.....	
28,000	28,000	.00159	.00008	.....	.....	
29,000	29,000	.00169	.00010	.....	.....	
30,000	30,000	.00179	.00010	.00030	.00013	
31,000	31,000	.00190	.00011	.....	.....	
32,000	32,000	.00200	.00010	.....	.....	
33,000	33,000	.00215	.00015	.....	.....	
34,000	34,000	.00225	.00010	.....	.....	
35,000	35,000	.00242	.00017	.00071	.00041	
36,000	36,000	.00262	.00020	.....	.....	
37,000	37,000	.00282	.00020	.....	.....	
38,000	38,000	.00300	.00018	.....	.....	
39,000	39,000	.00325	.00025	.....	.....	
40,000	40,000	.00380	.00055	.00168	.00097	
55,610	55,610	.....	.....	.....	.....	Ultimate stre

Failed by triple flexure.

CAST-IRON BODY, NO. 10.

No. 3911.

Marks, $^{12\ M\ R_{10}\ T\ R_1}_{M\ T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.
Length of stem, 23″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000040	.000040	.....	.....	
3,000	3,000	.000080	.000040	.....	.....	
4,000	4,000	.000120	.000040	.....	.....	
5,000	5,000	.000160	.000040	.000005	.000005	
6,000	6,000	.000200	.000040	.....	.....	
7,000	7,000	.000265	.000065	.....	.....	
8,000	8,000	.000320	.000055	.....	.....	
9,000	9,000	.000380	.000060	.....	.....	
10,000	10,000	.000435	.000055	.000010	.000015	
11,000	11,000	.000490	.000055	.....	.....	
12,000	12,000	.000545	.000055	.000020	.000020	
13,000	13,000	.000605	.000060	.....	.....	
14,000	14,000	.000675	.000070	.000040	.000020	
15,000	15,000	.000745	.000070	.....	.....	
16,000	16,000	.000810	.000065	.000065	.000025	
17,000	17,000	.000880	.000070	.....	.....	
18,000	18,000	.000950	.000070	.000085	.000020	
19,000	19,000	.001030	.000080	.....	.....	
20,000	20,000	.001095	.000065	.000105	.000020	
21,000	21,000	.001185	.000090	.....	.....	
22,000	22,000	.001260	.000075	.000155	.000050	
23,000	23,000	.001355	.000095	.....	.....	
24,000	24,000	.001445	.000090	.000215	.000060	
25,000	25,000	.001570	.000075	.000270	.000055	
31,540	31,540	.....	.....	.....	.....	Tensile strength.

Fractured 2″ from neck.
Appearance, granular.
Specific gravity, 7.2866.
Hardness, 18.48.

No. 3912.

Marks, $^{12}\,\mathrm{M}\,\mathrm{R}_{\mathrm{B}}^{\mathrm{R}_2}\,\mathrm{T}\,\mathrm{R}_2$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.
Length of stem, 23″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	.0	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000105	.000050	.....	.....	
4,000	4,000	.000160	.000055	.....	.....	
5,000	5,000	.000200	.000040	−.000005	−.000005	
6,000	6,000	.000245	.000045	.....	.....	
7,000	7,000	.000280	.000035	.....	.....	
8,000	8,000	.000325	.000045	.....	.....	
9,000	9,000	.000380	.000055	.....	.....	
10,000	10,000	.000445	.000065	−.000015	−.000010	
11,000	11,000	.000500	.000055	.....	.....	
12,000	12,000	.000565	.000065	0.	.000015	
13,000	13,000	.000640	.000075	.....	.....	
14,000	14,000	.000705	.000065	.000040	.000040	
15,000	15,000	.000790	.000085	.....	.....	
16,000	16,000	.000865	.000075	.000065	.000025	
17,000	17,000	.000940	.000075	.....	.....	
18,000	18,000	.001030	.000090	.000110	.000055	
19,000	19,000	.001125	.000095	.....	.....	
20,000	20,000	.001215	.000090	.000180	.000070	
21,000	21,000	.001330	.000115	.....	.....	
22,000	22,000	.001450	.000120	.000270	.000090	
23,000	23,000	.001600	.000150	.....	.....	
24,000	24,000	.001755	.000155	.000435	.000165	
25,000	25,000	.001980	.000225	.000575	.000140	
29,880	29,880	.....	.....	.....	.....	Tensile strength.

ctured 3″.75 from neck.
earance, granular.
ific gravity, 7.2838.
dness, 16.56.

No. 823.

Marks, $\frac{12\ M\ R_{10}\ T\ R_2}{B\ T_9}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
1,000	1,000	0.	0.	0.	0.	
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00019	.00005	0.	.....	
6,000	6,000	.00024	.00005	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00041	.00005	.....	.....	
10,000	10,000	.00047	.00006	.00001	.00001	
11,000	11,000	.00052	.00005	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00063	.00005	.....	.....	
14,000	14,000	.00068	.00005	.....	.....	
15,000	15,000	.00073	.00005	.00005	.00004	
16,000	16,000	.00080	.00007	.....	.....	
17,000	17,000	.00087	.00007	.....	.....	
18,000	18,000	.00093	.00006	.....	.....	
19,000	19,000	.00098	.00005	.....	.....	
20,000	20,000	.00103	.00005	.00009	.00004	
21,000	21,000	.00109	.00006	.....	.....	
22,000	22,000	.00117	.00008	.....	.....	
23,000	23,000	.00122	.00005	.....	.....	
24,000	24,000	.00129	.00007	.....	.....	
25,000	25,000	.00136	.00007	.00017	.00008	
26,000	26,000	.00143	.00007	.....	.....	
27,000	27,000	.00151	.00008	.....	.....	
28,000	28,000	.00158	.00007	.....	.....	
29,000	29,000	.00167	.00009	.....	.....	
30,000	30,000	.00177	.00010	.00033	.00016	
31,000	31,000	.00189	.00012	.....	.....	
32,000	32,000	.00200	.00011	.....	.....	
33,000	33,000	.00213	.00013	.....	.....	
34,000	34,000	.00229	.00016	.....	.....	
35,000	35,000	.00245	.00016	.00075	.00042	
36,000	36,000	.00270	.00025	.....	.....	
37,000	37,000	.00288	.00018	.....	.....	
38,000	38,000	.00309	.00021	.....	.....	
39,000	39,000	.00340	.00031	.....	.....	
40,000	40,000	.00370	.00030	.00174	.00099	
56,400	56,400	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 824.

Marks, $\frac{12\ M\ R_{10}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00002	.00002	.....	.....	
3,000	3,000	.00006	.00004	.....	.....	
4,000	4,000	.00012	.00006	.....	.....	
5,000	5,000	.00016	.00004	0.	.....	
6,000	6,000	.00020	.00004	.....	.....	
7,000	7,000	.00024	.00004	.....	.....	
8,000	8,000	.00030	.00006	.....	.....	
9,000	9,000	.00036	.00006	.....	.....	
10,000	10,000	.00042	.00006	0.	.....	
11,000	11,000	.00046	.00004	.....	.....	
12,000	12,000	.00052	.00006	.....	.....	
13,000	13,000	.00058	.00006	.....	.....	
14,000	14,000	.00062	.00004	.....	.....	
15,000	15,000	.00068	.00006	.00002	.00002	
16,000	16,000	.00072	.00004	.....	.....	
17,000	17,000	.00078	.00006	.....	.....	
18,000	18,000	.00084	.00006	.....	.....	
19,000	19,000	.00090	.00006	.....	.....	
20,000	20,000	.00096	.00006	.00010	.00008	
21,000	21,000	.00104	.00008	.....	.....	
22,000	22,000	.00110	.00006	.....	.....	
23,000	23,000	.00116	.00006	.....	.....	
24,000	24,000	.00124	.00008	.....	.....	
25,000	25,000	.00132	.00008	.00018	.00008	
26,000	26,000	.00142	.00010	.....	.....	
27,000	27,000	.00148	.00006	.....	.....	
28,000	28,000	.00156	.00008	.....	.....	
29,000	29,000	.00164	.00008	.....	.....	
30,000	30,000	.00174	.00010	.00036	.00018	
31,000	31,000	.00188	.00014	.....	.....	
32,000	32,000	.00196	.00008	.....	.....	
33,000	33,000	.00208	.00012	.....	.....	
34,000	34,000	.00222	.00014	.....	.....	
35,000	35,000	.00242	.00020	.00076	.00040	
36,000	36,000	.00264	.00022	.....	.....	
37,000	37,000	.00284	.00020	.....	.....	
38,000	38,000	.00312	.00028	.....	.....	
39,000	39,000	.00342	.00030	.....	.....	
40,000	40,000	.00378	.00036	.00186	.00110	
64,900	64,900	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 11.

No. 3976.

Marks, $^{12\,M\,R_{11}\,1\,T\,R_1}_{M\,T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.
Length of stem, 23″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000045	.000045	.....	.....	
3,000	3,000	.000095	.000050	.....	.....	
4,000	4,000	.000145	.000050	.....	.....	
5,000	5,000	.000200	.000055	0.	.....	
6,000	6,000	.000245	.000045	.....	.....	
7,000	7,000	.000300	.000055	.....	.....	
8,000	8,000	.000345	.000045	.....	.....	
9,000	9,000	.000395	.000050	.....	.....	
10,000	10,000	.000455	.000060	.000005	.000005	
11,000	11,000	.000505	.000050	.....	.....	
12,000	12,000	.000560	.000055	.000015	.000010	
13,000	13,000	.000620	.000060	.....	.....	
14,000	14,000	.000680	.000060	.000040	.000025	
15,000	15,000	.000745	.000065	.....	.....	
16,000	16,000	.000800	.000055	.000050	.000010	
17,000	17,000	.000865	.000065	.....	.....	
18,000	18,000	.000940	.000075	.000085	.000035	
19,000	19,000	.001015	.000075	.....	.....	
20,000	20,000	.001100	.000085	.000120	.000035	
21,000	21,000	.001190	.000090	.....	.....	
22,000	22,000	.001290	.000100	.000190	.000070	
23,000	23,000	.001390	.000100	.....	.....	
24,000	24,000	.001490	.000100	.000270	.000080	
25,000	25,000	.001640	.000150	.000345	.000075	
29,180	29,180	.....	.....	.....	.....	Tensile strength.

Fractured 3″.5 from neck.
Appearance, granular, mottled.

No. 827.

Marks, $^{12\ M\ R_{II}\ T\ B_I}_{M\ T_p}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000060	.000060	.....	.....	
3,000	3,000	.000100	.000040	.....	.....	
4,000	4,000	.000130	.000030	.....	.....	
5,000	5,000	.000180	.000050	0.	0.	
6,000	6,000	.000230	.000050	.....	.....	
7,000	7,000	.000280	.000050	.....	.....	
8,000	8,000	.000330	.000050	.....	.....	
9,000	9,000	.000380	.000050	.....	.....	
10,000	10,000	.000430	.000050	.000010	.000010	
11,000	11,000	.000490	.000060	.....	.....	
12,000	12,000	.000560	.000070	.....	.....	
13,000	13,000	.000600	.000040	.....	.....	
14,000	14,000	.000660	.000060	.....	.....	
15,000	15,000	.000710	.000050	.000060	.000050	
16,000	16,000	.000770	.000060	.....	.....	
17,000	17,000	.000820	.000050	.....	.....	
18,000	18,000	.000880	.000060	.....	.....	
19,000	19,000	.000920	.000040	.....	.....	
20,000	20,000	.000980	.000060	.000090	.000030	
21,000	21,000	.001030	.000050	.....	.....	
22,000	22,000	.001100	.000070	.....	.....	
23,000	23,000	.001160	.000060	.....	.....	
24,000	24,000	.001210	.000050	.....	.....	
25,000	25,000	.001290	.000080	.000170	.000080	
26,000	26,000	.001360	.000070	.....	.....	
27,000	27,000	.001410	.000050	.....	.....	
28,000	28,000	.001500	.000090	.....	.....	
29,000	29,000	.001570	.000070	.....	.....	
30,000	30,000	.001660	.000090	.000280	.000110	
31,000	31,000	.001740	.000080	.....	.....	
32,000	32,000	.001810	.000070	.....	.....	
33,000	33,000	.001910	.000100	.....	.....	
34,000	34,000	.002040	.000130	.....	.....	
35,000	35,000	.002210	.000170	.000570	.000290	
36,000	36,000	.002320	.000110	.....	.....	
37,000	37,000	.002500	.000180	.....	.....	
38,000	38,000	.002680	.000180	.....	.....	
39,000	39,000	.002910	.000230	.....	.....	
40,000	40,000	.003130	.000220	.001300	.000730	
56,050	56,050	.....	.....	.....	.....	Ultimate strength.

Triple flexure.

No. 3913.

Marks, $\frac{12\ M\ R_1\ T\ R_2}{B\ T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.
Length of stem, 23″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	.....	.....	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000095	.000045	.....	.....	
4,000	4,000	.000145	.000050	.....	.....	
5,000	5,000	.000200	.000055	0.	0.	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000310	.000060	.....	.....	
8,000	8,000	.000380	.000070	.....	.....	
9,000	9,000	.000440	.000060	.....	.....	
10,000	10,000	.000490	.000050	.000035	.000035	
11,000	11,000	.000545	.000055	.....	.....	
12,000	12,000	.000600	.000055	.000040	.000005	
13,000	13,000	.000680	.000080	.....	.....	
14,000	14,000	.000755	.000075	.000060	.000020	
15,000	15,000	.000830	.000075	.....	.....	
16,000	16,000	.000905	.000075	.000095	.000035	
17,000	17,000	.000990	.000085	.....	.....	
18,000	18,000	.001090	.000100	.000145	.000050	
19,000	19,000	.001185	.000095	.....	.....	
20,000	20,000	.001290	.000105	.000220	.000075	
21,000	21,000	.001405	.000115	.....	.....	
22,000	22,000	.001535	.000130	.000340	.000120	
23,000	23,000	.001730	.000190	.....	.....	
24,000	24,000	.001900	.000170	.000550	.000210	
25,000	25,000	.002130	.000230	.000700	.000150	
32,290	32,290	.....	.....	.....	.....	Tensile strength.

Fractured at middle of stem.
Appearance, granular.
Specific gravity, 7.3136.
Hardness, 15.43.

No. 825.

Marks, $^{12\ M\ R_{II}\ T\ R_2}_{B\ T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000030	.000030	.....	.....	
3,000	3,000	.000080	.000050	.....	.....	
4,000	4,000	.000130	.000050	.....	.....	
5,000	5,000	.000180	.000050	0.	0.	
6,000	6,000	.000230	.000050	.....	.....	
7,000	7,000	.000280	.000050	.....	.....	
8,000	8,000	.000330	.000050	.....	.....	
9,000	9,000	.000390	.000060	.....	.....	
10,000	10,000	.000440	.000050	.000010	.000010	
11,000	11,000	.000500	.000060	.....	.....	
12,000	12,000	.000540	.000040	.....	.....	
13,000	13,000	.000600	.000060	.....	.....	
14,000	14,000	.000670	.000070	.....	.....	
15,000	15,000	.000710	.000040	.000060	.000050	
16,000	16,000	.000780	.000070	.....	.....	
17,000	17,000	.000830	.000050	.....	.....	
18,000	18,000	.000900	.000070	.....	.....	
19,000	19,000	.000960	.000060	.....	.....	
20,000	20,000	.001010	.000050	.000100	.000040	
21,000	21,000	.001070	.000060	.....	.....	
22,000	22,000	.001130	.000060	.....	.....	
23,000	23,000	.001200	.000070	.....	.....	
24,000	24,000	.001280	.000080	.....	.....	
25,000	25,000	.001370	.000090	.000200	.000100	
26,000	26,000	.001430	.000060	.....	.....	
27,000	27,000	.001510	.000080	.....	.....	
28,000	28,000	.001600	.000090	.....	.....	
29,000	29,000	.001700	.000100	.....	.....	
30,000	30,000	.001810	.000110	.000410	.000210	
31,000	31,000	.001930	.000120	.....	.....	
32,000	32,000	.002060	.000130	.....	.....	
33,000	33,000	.002180	.000120	.....	.....	
34,000	34,000	.002360	.000180	.....	.....	
35,000	35,000	.002580	.000220	.000020	.000510	
36,000	36,000	.002810	.000230	.....	.....	
37,000	37,000	.003080	.000270	.....	.....	
38,000	38,000	.003390	.000310	.....	.....	
39,000	39,000	.003720	.000330	.....	.....	
40,000	40,000	.004180	.000460	.002220	.001300	
53,800	53,800	.....	.....	.....	.....	Ultimate.

Triple flexure.

CAST-IRON BODY, NO. 12.

No. 3980.

Marks, $\frac{12\ M\ R_{13}}{M\ T_1}\ T\ R_1$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000040	.000040	.....	.....	
3,000	3,000	.000090	.000050	.....	.....	
4,000	4,000	.000140	.000050	.....	.....	
5,000	5,000	.000195	.000055	0.	.....	
6,000	6,000	.000245	.000050	.....	.....	
7,000	7,000	.000300	.000055	.....	.....	
8,000	8,000	.000350	.000050	.....	.....	
9,000	9,000	.000405	.000055	.....	.....	
10,000	10,000	.000455	.000050	.000005	.000005	
11,000	11,000	.000510	.000055	.....	.....	
12,000	12,000	.000570	.000060	.000015	.000015	
13,000	13,000	.000635	.000065	.....	.....	
14,000	14,000	.000695	.000060	.000035	.000020	
15,000	15,000	.000755	.000060	.....	.....	
16,000	16,000	.000815	.000060	.000050	.000015	
17,000	17,000	.000890	.000075	.....	.....	
18,000	18,000	.000960	.000070	.000070	.000020	
19,000	19,000	.001040	.000080	.....	.....	
20,000	20,000	.001105	.000065	.000100	.000030	
21,000	21,000	.001190	.000085	.....	.....	
22,000	22,000	.001290	.000100	.000150	.000050	
23,000	23,000	.001385	.000095	.....	.....	
24,000	24,000	.001485	.000100	.000203	.000055	
25,000	25,000	.001600	.000115	.000255	.000050	
29,210	29,210	.....	.....	.....	.....	Tensile strength.

Fractured $\frac{5}{8}$″ from neck.
Appearance, uniform granular.
Specific gravity, 7.2767.
Hardness, 18.58.

No. 831.

Marks, $\frac{12\,M\,R_{13}\,T\,R_1}{M\,T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00020	.00006	0.	.....	
6,000	6,000	.00025	.00005	.....	.....	
7,000	7,000	.00030	.00005	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00041	.00005	.....	.....	
10,000	10,000	.00047	.00006	.00002	.00002	
11,000	11,000	.00052	.00005	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00065	.00007	.....	.....	
14,000	14,000	.00071	.00006	.....	.....	
15,000	15,000	.00075	.00004	.00008	.00006	
16,000	16,000	.00081	.00006	.....	.....	
17,000	17,000	.00087	.00006	.....	.....	
18,000	18,000	.00092	.00005	.....	.....	
19,000	19,000	.00098	.00006	.....	.....	
20,000	20,000	.00103	.00005	.00010	.00002	
21,000	21,000	.00109	.00006	.....	.....	
22,000	22,000	.00115	.00006	.....	.....	
23,000	23,000	.00121	.00006	.....	.....	
24,000	24,000	.00128	.00007	.....	.....	
25,000	25,000	.00133	.00005	.00017	.00007	
26,000	26,000	.00140	.00007	.....	.....	
27,000	27,000	.00147	.00007	.....	.....	
28,000	28,000	.00152	.00005	.....	.....	
29,000	29,000	.00160	.00008	.....	.....	
30,000	30,000	.00168	.00008	.00023	.00006	
31,000	31,000	.00174	.00006	.....	.....	
32,000	32,000	.00182	.00008	.....	.....	
33,000	33,000	.00190	.00008	.....	.....	
34,000	34,000	.00199	.00009	.....	.....	
35,000	35,000	.00208	.00009	.00040	.00017	
36,000	36,000	.00220	.00012	.....	.....	
37,000	37,000	.00230	.00010	.....	.....	
38,000	38,000	.00242	.00012	.....	.....	
39,000	39,000	.00253	.00011	.....	.....	
40,000	40,000	.00271	.00018	.00076	.00036	
61,750	61,750	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 3978.

Marks, $\frac{12\ M\ R_{12}\ T\ R_2}{B\ T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.
Length of stem, 23″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000060	.000060	.....	.....	
3,000	3,000	.000135	.000075	.....	.....	
4,000	4,000	.000185	.000050	.....	.....	
5,000	5,000	.000245	.000060	.000015	.000015	
6,000	6,000	.000295	.000050	.....	.....	
7,000	7,000	.000355	.000060	.....	.....	
8,000	8,000	.000430	.000075	.....	.....	
9,000	9,000	.000495	.000065	.....	.....	
10,000	10,000	.000565	.000070	.000045	.000030	
11,000	11,000	.000640	.000075	.....	.....	
12,000	12,000	.000710	.000070	.000055	.000010	
13,000	13,000	.000790	.000080	.....	.....	
14,000	14,000	.000880	.000090	.000090	.000035	
15,000	15,000	.000970	.000090	.....	.....	
16,000	16,000	.001070	.000100	.000140	.000050	
17,000	17,000	.001160	.000090	.....	.....	
18,000	18,000	.001275	.000115	.000205	.000065	
19,000	19,000	.001400	.000125	.....	.....	
20,000	20,000	.001560	.000160	.000335	.000130	
21,000	21,000	.001710	.000150	.....	.....	
22,000	22,000	.001890	.000180	.000490	.000165	
23,000	23,000	.002140	.000250	.....	.....	
24,000	24,000	.002390	.000250	.000810	.000320	
25,000	25,000	.002750	.000360	.001055	.000245	
26,270	26,270	.....	.....	.....	.....	Tensile strength.

Fractured 6″ from neck.
Appearance, uniform granular.
Specific gravity, 7.2810.
Hardness, 15 43

No. 3979.

rks, $\frac{12\ M\ R_{12}\ T\ R_2}{B\ T_2}$
meter, 1″.129.
tional area, 1 square inch.
ged length, 20″.
gth of stem, 23″.

pplied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
l.	Per square inch.					
ls.	Pounds.	Inch.	Inch.	Inch.	Inch.	
	1,000	0.	0.	0.	0.	Initial load.
	2,000	.000055	.000055	.....	.....	
	3,000	.000110	.000055	.....	.....	
	4,000	.000165	.000055	.....	.....	
	5,000	.000225	.000060	.000005	.000005	
	6,000	.000290	.000065	.....	.....	
	7,000	.000350	.000060	.....	.....	
	8,000	.000410	.000060	.....	.....	
	9,000	.000490	.000080	.....	.....	
	10,000	.000555	.000065	.000040	.000035	
	11,000	.000620	.000065	.....	.....	
	12,000	.000695	.000065	.000050	.000010	
	13,000	.000780	.000085	.....	.....	
	14,000	.000860	.000080	.000080	.000030	
	15,000	.000945	.000085	.....	.....	
	16,000	.001050	.000105	.000115	.000035	
	17,000	.001150	.000100	.....	.....	
	18,000	.001255	.000105	.000190	.000075	
	19,000	.001395	.000140	.....	.....	
	20,000	.001515	.000120	.000290	.000100	
	21,000	.001660	.000145	.....	.....	
	22,000	.001850	.000190	.000460	.000170	
	23,000	.002085	.000235	.....	.....	
	24,000	.002350	.000265	.000760	.000300	
	25,000	.002685	.000335	.001000	.000240	
	27,360	.....	.....	.....	.....	Tensile strength.

tured 4″ from neck.
earance, uniform granular.

TENACITY SPECIMENS.

eral marks, 12 M R_{12} T R_2.

	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inch.	Sq. inch.	Pounds.	Pounds.		
	B T_2 I	1.129	1.00	28,320	28,320	.....	.....
	B T_4 O	1.129	1.00	32,480	32,480	.....	.....
	B T_6 M	1.129	1.00	29,910	29,910	.....	.....
	B L_4 I	1.129	1.00	29,300	29,300	7.2832	15.75
				Upper end.	Upper end.	7.2792	15.43
	B L_7 O	1.129	1.00	29,490	29,490	7.2786	15.59
				Upper end.	Upper end.	7.2806	16.23
	B L_6 M	1.129	1.00	29,150	29,150	7.2755	15.41
				Upper end.	Upper end.	7.2780	14.61

ppearance of fractures, uniform granular.

DOES NOT CIRCULATE

No. 829.

Marks. $^{12\ M\ R_1\ TR_2}_{B\ T_9}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00016	.00007	.....	.....	
5,000	5,000	.00020	.00004	0.	.....	
6,000	6,000	.00027	.00007	.....	.....	
7,000	7,000	.00031	.00004	.....	.....	
8,000	8,000	.00038	.00007	.....	.....	
9,000	9,000	.00043	.00005	.....	.....	
10,000	10,000	.00049	.00006	.00001	.00001	
11,000	11,000	.00056	.00007	.....	.....	
12,000	12,000	.00061	.00005	.....	.....	
13,000	13,000	.00070	.00009	.....	.....	
14,000	14,000	.00077	.00007	.....	.....	
15,000	15,000	.00082	.00005	.0009	.0008	
16,000	16,000	.00088	.00006	.....	.....	
17,000	17,000	.00093	.00005	.....	.....	
18,000	18,000	.00099	.00006	.....	.....	
19,000	19,000	.00107	.00008	.....	.....	
20,000	20,000	.00114	.00007	.00013	.00004	
21,000	21,000	.00120	.00006	.....	.....	
22,000	22,000	.00129	.00009	.....	.....	
23,000	23,000	.00137	.00008	.....	.....	
24,000	24,000	.00143	.00006	.....	.....	
25,000	25,000	.00151	.00008	.00023	.00010	
26,000	26,000	.00160	.00009	.....	.....	
27,000	27,000	.00168	.00008	.....	.....	
28,000	28,000	.00178	.00010	.....	.....	
29,000	29,000	.00188	.00010	.....	.....	
30,000	30,000	.00200	.00012	.00043	.00020	
31,000	31,000	.00212	.00012	.....	.....	
32,000	32,000	.00225	.00013	.....	.....	
33,000	33,000	.00240	.00015	.....	.....	
34,000	34,000	.00258	.00018	.....	.....	
35,000	35,000	.00288	.00030	.00091	.00048	
36,000	36,000	.00301	.00013	.....	.....	
37,000	37,000	.00322	.00021	.....	.....	
38,000	38,000	.00347	.00025	.....	.....	
39,000	39,000	.00373	.00026	.....	.....	
40,000	40,000	.00418	.00045	.00201	.00110	
51,100	54,100	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 830.

12 M R_{12} T R_2
B R_{10}
10″.
er, 1″.129.
al area, 1 square inch.
length, 5″.

loads. per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	0.	0.	0.	0.	Initial load.
2,000	.00004	.00004			
3,000	.00010	.00006			
4,000	.00014	.00004			
5,000	.00020	.00006	0.		
6,000	.00026	.00006			
7,000	.00030	.00004			
8,000	.00036	.00006			
9,000	.00042	.00006			
10,000	.00048	.00006	.00002	.00002	
11,000	.00054	.00006			
12,000	.00060	.00006			
13,000	.00066	.00006			
14,000	.00074	.00008			
15,000	.00078	.00004	.00008	.00006	
16,000	.00084	.00006			
17,000	.00092	.00008			
18,000	.00098	.00006			
19,000	.00104	.00006	.00010	.00002	
20,000	.00110	.00006			
21,000	.00116	.00006			
22,000	.00124	.00008			
23,000	.00132	.00008			
24,000	.00140	.00008			
25,000	.00148	.00008	00022	.00012	
26,000	.00156	.00008			
27,000	.00166	.00010			
28,000	.00176	.00010			
29,000	.00186	.00010			
30,000	.00196	.00010	.00040	.00018	
31,000	.00210	.00014			
32,000	.00224	.00014			
33,000	.00236	.00012			
34,000	.00252	.00016			
35,000	.00276	.00024	.00090	.00050	
36,000	.00296	.00020			
37,000	.00312	.00016			
38,000	.00336	.00024			
39,000	.00368	.00032			
40,000	.00402	.00034	.00190	.00100	
40,980					Ultimate strength.

triple flexure.

CAST-IRON BODY, No. 13.

No. 3982.

Marks, $\frac{12\ M\ R_{11}\ T\ R_1}{M\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000095	.000045	.....	.....	
4,000	4,000	.000150	.000055	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000350	.000050	.....	.....	
9,000	9,000	.000405	.000055	.....	.....	
10,000	10,000	.000460	.000055	.000015	.000015	
11,000	11,000	.000525	.000065	.....	.....	
12,000	12,000	.000585	.000060	.000035	.000020	
13,000	13,000	.000650	.000065	.....	.....	
14,000	14,000	.000710	.000060	.000055	.000020	
15,000	15,000	.000785	.000075	.....	.....	
16,000	16,000	.000850	.000065	.000085	.000030	
17,000	17,000	.000940	.000090	.....	.....	
18,000	18,000	.001020	.000080	.000120	.000035	
19,000	19,000	.001110	.000090	.....	.....	
20,000	20,000	.001210	.000100	.000190	.000070	
21,000	21,000	.001335	.000125	.....	.....	
22,000	22,000	.001440	.000105	.000285	.000095	
23,000	23,000	.001585	.000145	.....	.....	
24,000	24,000	.001735	.000150	.000435	.000150	
25,000	25,000	.001935	.000200	.000550	.000115	
29,640	29,640	.....	.....	.....	.....	Tensile strength.

Fractured 2½″ from neck.
Appearance, uniform granular.
Specific gravity, 7.2928.
Hardness, 15.99.

No. 3983.

Marks, $\frac{12\ M\ R_{13}\ T\ R_1}{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000355	.000050	.....	.....	
9,000	9,000	.000415	.000060	.....	.....	
10,000	10,000	.000470	.000055	.000010	.000010	
11,000	11,000	.000535	.000065	.....	.....	
12,000	12,000	.000595	.000060	.000035	.000025	
13,000	13,000	.000655	.000060	.....	.....	
14,000	14,000	.000735	.000080	.000050	.000015	
15,000	15,000	.000795	.000060	.....	.....	
16,000	16,000	.000860	.000065	.000080	.000030	
17,000	17,000	.000950	.000090	.....	.....	
18,000	18,000	.001025	.000075	.000110	.000030	
19,000	19,000	.001115	.000090	.....	.....	
20,000	20,000	.001215	.000100	.000175	.000065	
21,000	21,000	.001310	.000095	.....	.....	
22,000	22,000	.001435	.000125	.000255	.000080	
23,000	23,000	.001565	.000130	.....	.....	
24,000	24,000	.001780	.000165	.000400	.000145	
25,000	25,000	.001905	.000175	.000510	.000110	
29,580	29,590	.....	.....	.....	.....	Tensile strength.

Fractured 1¼″ from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{13} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
3986	M T_2 I	1.129	1.00	33,190	33,190	7.2904	17.35
3987	M T_2 O	1.129	1.00	32,640	32,640	7.2872	16.56
3988	M T_2 M	1.129	1.00	33,510	33,510	7.3001	16.73
3989	M T_2 O X	1.129	1.00	33,790	33,790	.....	.....

Appearance of fractures, uniform granular.

No. 835.

Marks, $\frac{^{12}\text{M R}_{12}\text{ T R}_1}{\text{M T}_9\text{ X}}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00035	.00005	.....	.....	
9,000	9,000	.00040	.00005	.....	.....	
10,000	10,000	.00045	.00005	.00003	.00003	
11,000	11,000	.00050	.00005	.....	.....	
12,000	12,000	.00056	.00006	.....	.....	
13,000	13,000	.00061	.00005	.....	.....	
14,000	14,000	.00068	.00007	.....	.....	
15,000	15,000	.00073	.00005	.00007	.00004	
16,000	16,000	.00080	.00007	.....	.....	
17,000	17,000	.00085	.00005	.....	.....	
18,000	18,000	.00092	.00007	.....	.....	
19,000	19,000	.00098	.00006	.....	.....	
20,000	20,000	.00104	.00006	.00011	.00004	
21,000	21,000	.00111	.00007	.....	.....	
22,000	22,000	.00116	.00005	.....	.....	
23,000	23,000	.00121	.00005	.....	.....	
24,000	24,000	.00127	.00006	.....	.....	
25,000	25,000	.00135	.00008	.00020	.00009	
26,000	26,000	.00143	.00008	.....	.....	
27,000	27,000	.00152	.00009	.....	.....	
28,000	28,000	.00159	.00007	.....	.....	
29,000	29,000	.00168	.00009	.....	.....	
30,000	30,000	.00177	.00009	.00034	.00014	
31,000	31,000	.00189	.00012	.....	.....	
32,000	32,000	.00199	.00010	.....	.....	
33,000	33,000	.00211	.00012	.....	.....	
34,000	34,000	.00227	.00016	.....	.....	
35,000	35,000	.00240	.00013	.00072	.00038	
36,000	36,000	.00265	.00025	.....	.....	
37,000	37,000	.00280	.00015	.....	.....	
38,000	38,000	.00300	.00020	.....	.....	
39,000	39,000	.00328	.00028	.....	.....	
40,000	40,000	.00360	.00032	.00167	.00095	
55,400	55,400	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 3984.

Marks, $\frac{12\ M\ R_{II}\ T\ R_2}{B\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050			
3,000	3,000	.000100	.000050			
4,000	4,000	.000155	.000055			
5,000	5,000	.000210	.000055	0.		
6,000	6,000	.000275	.000065			
7,000	7,000	.000330	.000055			
8,000	8,000	.000385	.000055			
9,000	9,000	.000440	.000055			
10,000	10,000	.000500	.000060	.000030	.000030	
11,000	11,000	.000570	.000070			
12,000	12,000	.000630	.000060	.000050	.000020	
13,000	13,000	.000700	.000070			
14,000	14,000	.000780	.000080	.000080	.000030	
15,000	15,000	.000850	.000070			
16,000	16,000	.000945	.000095	.000115	.000035	
17,000	17,000	.001030	.000085			
18,000	18,000	.001130	.000100	.000180	.000065	
19,000	19,000	.001240	.000110			
20,000	20,000	.001370	.000130	.000260	.000080	
21,000	21,000	.001495	.000125			
22,000	22,000	.001580	.000085	.000395	.000135	
23,000	23,000	.001825	.000245			
24,000	24,000	.002040	.000215	.000640	.000245	
25,000	25,000	.002375	.000335	.000880	.000240	
22,560	22,560					Tensile strength.

Fractured 6″ from neck.
Appearance, uniform granular.
Specific gravity, 7.2925.
Hardness, 14.73.

No. 3985.

Marks, $\frac{12\ M\ R_{13}\ T\ R_2}{B\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000360	.000055	.....	.....	
9,000	9,000	.000430	.000070	.....	.....	
10,000	10,000	.000490	.000060	.000035	.000035	
11,000	11,000	.000550	.000060	.....	.....	
12,000	12,000	.000615	.000065	.000050	.000015	
13,000	13,000	.000690	.000075	.....	.....	
14,000	14,000	.000760	.000070	.000085	.000035	
15,000	15,000	.000845	.000085	.....	.....	
16,000	16,000	.000930	.000085	.000110	.000025	
17,000	17,000	.001010	.000080	.....	.....	
18,000	18,000	.001110	.000100	.000180	.000070	
19,000	19,000	.001230	.000120	.....	.....	
20,000	20,000	.001340	.000110	.000255	.000075	
21,000	21,000	.001490	.000150	.....	.....	
22,000	22,000	.001640	.000150	.000405	.000150	
23,000	23,000	.001850	.000210	.....	.....	
24,000	24,000	.002055	.000205	.000650	.000245	
25,000	25,000	.002350	.000295	.000860	.000210	
27,220	27,220	.....	.....	.....	.....	Tensile strength.

Fractured 5¼″ from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{13} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
3099	B T_3 I	1.129	1.00	31,490	31,490	7.2992	14.98
3100	B T_4 O	1.129	1.00	33,710	33,710	7.2891	15.06
3101	B T_5 M	1.129	1.00	32,980	32,980	7.2983	14.98
3102	B T_6 I	1.129	1.00	33,500	33,500	.....	.....
3103	B T_7 O	1.129	1.00	32,610	32,610	.....	.....
3104	B T_8 M	1.129	1.00	33,430	33,430	7.3017	15.35

No. 833.

Marks, $^{12\,M\,R_{II}\,T\,R_2}_{B\,T_2}$

Length, 12″.

Diameter, 1″.129.

Sectional area, 1 square inch.

Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	0.	.....	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00037	.00006	.....	.....	
9,000	9,000	.00042	.00005	.....	.....	
10,000	10,000	.00048	.00006	.00005	.00005	
11,000	11,000	.00053	.00005	.....	.....	
12,000	12,000	.00058	.00005	.....	.....	
13,000	13,000	.00063	.00005	.....	.....	
14,000	14,000	.00070	.00007	.....	.....	
15,000	15,000	.00077	.00007	.00009	.00004	
16,000	16,000	.00083	.00006	.....	.....	
17,000	17,000	.00089	.00006	.....	.....	
18,000	18,000	.00094	.00005	.....	.....	
19,000	19,000	.00101	.00007	.....	.....	
20,000	20,000	.00108	.00007	.00014	.00005	
21,000	21,000	.00114	.00006	.....	.....	
22,000	22,000	.00120	.00006	.....	.....	
23,000	23,000	.00127	.00007	.....	.....	
24,000	24,000	.00133	.00006	.....	.....	
25,000	25,000	.00141	.00008	.00025	.00011	
26,000	26,000	.00150	.00009	.....	.....	
27,000	27,000	.00159	.00009	.....	.....	
28,000	28,000	.00171	.00012	.....	.....	
29,000	29,000	.00182	.00011	.....	.....	
30,000	30,000	.00192	.00010	.00049	.00024	
31,000	31,000	.00208	.00016	.....	.....	
32,000	32,000	.00222	.00014	.....	.....	
33,000	33,000	.00242	.00020	.....	.....	
34,000	34,000	.00263	.00021	.....	.....	
35,000	35,000	.00287	.00024	.00119	.00070	
36,000	36,000	.00317	.00030	.....	.....	
37,000	37,000	.00345	.00028	.....	.....	
38,000	38,000	.00383	.00038	.....	.....	
39,000	39,000	.00428	.00045	.....	.....	
40,000	40,000	.00490	.00062	.00286	.00167	
52,200	52,200	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 834.

Marks, $\frac{12\ M\ R_{12}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00012	.00006	.....	.....	
4,000	4,000	.00018	.00006	.....	.....	
5,000	5,000	.00022	.00004	.00002	.00002	
6,000	6,000	.00028	.00006	.....	.....	
7,000	7,000	.00032	.00004	.....	.....	
8,000	8,000	.00038	.00006	.....	.....	
9,000	9,000	.00044	.00006	.....	.....	
10,000	10,000	.00050	.00006	.00006	.00004	
11,000	11,000	.00054	.00004	.....	.....	
12,000	12,000	.00060	.00006	.....	.....	
13,000	13,000	.00068	.00008	.....	.....	
14,000	14,000	.00072	.00004	.....	.....	
15,000	15,000	.00078	.00006	.00010	.00004	
16,000	16,000	.00084	.00006	.....	.....	
17,000	17,000	.00090	.00006	.....	.....	
18,000	18,000	.00096	.00006	.....	.....	
19,000	19,000	.00102	.00006	.....	.....	
20,000	20,000	.00110	.00008	.00018	.00008	
21,000	21,000	.00116	.00006	.....	.....	
22,000	22,000	.00122	.00006	.....	.....	
23,000	23,000	.00126	.00004	.....	.....	
24,000	24,000	.00134	.00008	.....	.....	
25,000	25,000	.00144	.00010	.00024	.00006	
26,000	26,000	.00154	.00010	.....	.....	
27,000	27,000	.00158	.00004	.....	.....	
28,000	28,000	.00168	.00010	.....	.....	
29,000	29,000	.00178	.00010	.....	.....	
30,000	30,000	.00192	.00014	.00050	.00026	
31,000	31,000	.00208	.00016	.....	.....	
32,000	32,000	.00226	.00018	.....	.....	
33,000	33,000	.00244	.00018	.....	.....	
34,000	34,000	.00270	.00026	.....	.....	
35,000	35,000	.00294	.00024	.00120	.00070	
36,000	36,000	.00326	.00032	.....	.....	
37,000	37,000	.00360	.00034	.....	.....	
38,000	38,000	.00390	.00030	.....	.....	
39,000	39,000	.00418	.00028	.....	.....	
40,000	40,000	.00486	.00068	.00286	.00166	
62,600	62,600	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 14.

No. 3990.

Marks, $\frac{12\ M\ B_{14}\ T\ R_1}{M\ T_1}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000350	.000050	.....	.....	
9,000	9,000	.000400	.000050	.....	.....	
10,000	10,000	.000450	.000050	.000005	.000005	
11,000	11,000	.000500	.000050	.....	.....	
12,000	12,000	.000560	.000060	.000025	.000020	
13,000	13,000	.000635	.000075	.....	.....	
14,000	14,000	.000690	.000055	.000035	.000010	
15,000	15,000	.000750	.000060	.....	.....	
16,000	16,000	.000820	.000070	.000065	.000030	
17,000	17,000	.000885	.000065	.....	.....	
18,000	18,000	.000970	.000085	.000085	.000020	
19,000	19,000	.001050	.000080	.....	.....	
20,000	20,000	.001140	.000090	.000135	.000050	
21,000	21,000	.001210	.000070	.....	.....	
22,000	22,000	.001310	.000100	.000190	.000055	
23,000	23,000	.001435	.000125	.....	.....	
24,000	24,000	.001535	.000100	.000300	.000110	
25,000	25,000	.001700	.000165	.000385	.000085	
31,110	31,110	.....	.....	.....	.....	Tensile strength.

Fractured 2″.75 from neck.
Appearance, uniform granular.
Specific gravity, 7.2942.
Hardness, 17.26.

No. 3991.

Marks, $^{12\,M\,R_{14}\,T\,R_1}_{M\,T_2}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000355	.000055	.....	.....	
9,000	9,000	.000410	.000055	.....	.....	
10,000	10,000	.000465	.000055	.000035	.000035	
11,000	11,000	.000515	.000050	.....	.....	
12,000	12,000	.000585	.000070	.000040	.000005	
13,000	13,000	.000645	.000060	.....	.....	
14,000	14,000	.000705	.000060	.000055	.000015	
15,000	15,000	.000760	.000055	.....	.....	
16,000	16,000	.000835	.000075	.000085	.000030	
17,000	17,000	.000910	.000075	.....	.....	
18,000	18,000	.000990	.000080	.000110	.000025	
19,000	19,000	.001060	.000070	.....	.....	
20,000	20,000	.001150	.000090	.000155	.000045	
21,000	21,000	.001245	.000095	.....	.....	
22,000	22,000	.001345	.000100	.000240	.000085	
23,000	23,000	.001455	.000110	.....	.....	
24,000	24,000	.001585	.000130	.000335	.000095	
25,000	25,000	.001735	.000150	.000415	.000080	
30,020	30,020	.....	.....	.....	.....	Tensile strength.

Fractured 3″.5 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{14} T R_1

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per inch.		
		Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*		
3114	M T_3 I	1.129	1.00	36,420	36,420	7.3125	18.58
3115	M T_4 O	1.129	1.00	34,190	34,190	7.3024	16.73
3116	M T_5 M	1.129	1.00	32,400	32,400	7.3169	17.08
3117	M T_5 O X	1.129	1.00	33,720	33,720	.....	.....

Appearance of fractures, uniform granular.

No. 3988.

Marks, $\frac{12\ M\ B\ R_{14}\ T\ R_2}{B\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000060	.000060	.....	.....	
3,000	3,000	.000110	.000050	.....	.....	
4,000	4,000	.000160	.000050	.....	.....	
5,000	5,000	.000210	.000050	.000005	.000005	
6,000	6,000	.000260	.000050	.....	.....	
7,000	7,000	.000320	.000060	.....	.....	
8,000	8,000	.000380	.000060	.....	.....	
9,000	9,000	.000440	.000060	.....	.....	
10,000	10,000	.000500	.000060	.000035	.000030	
11,000	11,000	.000560	.000060	.....	.....	
12,000	12,000	.000630	.000070	.000050	0000015	
13,000	13,000	.000700	.000070	.....	.....	
14,000	14,000	.000765	.000065	.000070	.000020	
15,000	15,000	.000830	.000065	.....	.....	
16,000	16,000	.000920	.000090	.000110	.000040	
17,000	17,000	.001010	.000090	.....	.....	
18,000	18,000	.001105	.000095	.000160	.000050	
19,000	19,000	.001215	.000110	.....	.....	
20,000	20,000	.001340	.000125	.000260	.000100	
21,000	21,000	.001485	.000145	.....	.....	
22,000	22,000	.001635	.000150	.000405	.000145	
23,000	23,000	.001835	.000200	.....	.....	
24,000	24,000	.002050	.000215	.000660	.000255	
25,000	25,000	.002340	.000290	.000865	.000205	
31,410	31,410	.....	.....	.....	.....	Tensile strength.

Fractured 7″.5 from neck.
Appearance, uniform granular
Specific gravity, 7.3058.
Hardness, 15.06.

No. 3989.

Marks, $^{12\ M\ R_{14}\ T\ R_2}_{B\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000255	.000055	.....	.....	
7,000	7,000	.000315	.000060	.....	.....	
8,000	8,000	.000375	.000060	.....	.....	
9,000	9,000	.000430	.000055	.....	.....	
10,000	10,000	.000490	.000060	.000025	.000025	
11,000	11,000	.000550	.000060	.....	.....	
12,000	12,000	.000615	.000065	.000040	.000015	
13,000	13,000	.000685	.000070	.....	.....	
14,000	14,000	.000750	.000065	.000065	.000025	
15,000	15,000	.000835	.000085	.....	.....	
16,000	16,000	.000910	.000075	.000105	.000040	
17,000	17,000	.001000	.000090	.....	.....	
18,000	18,000	.001100	.000100	.000165	.000060	
19,000	19,000	.001230	.000130	.....	.....	
20,000	20,000	.001340	.000110	.000260	.000095	
21,000	21,000	.001485	.000145	.....	.....	
22,000	22,000	.001685	.000200	.000450	.000190	
22,000	23,000	.001845	.000160	.....	.....	
24,000	24,000	.002105	.000260	.000710	.000260	
25,000	25,000	.002400	.000295	.000980	.000220	
28,100	28,100	.....	.....	.....	.....	Tensile strength.

Fractured 6″.5 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{14} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
2105	B T_3 I	1.129	1.00	34,310	34,310	.....	.....
2106	B T_4 O	1.129	1.00	33,120	33,120	.....	.....
2107	B T_5 M	1.129	1.00	33,710	33,710	.....	.....
2108	B L_6 I	1.129	1.00	33,200	33,200	7.3147	15.75
2109	B L_7 O	1.129	1.00	33,580	33,580	7.3132	15.20
2113	B L_8 M	1.129	1.00	33,970	33,970	7.3145	15.13

Appearance of fractures, uniform granular.

No. 837.

Marks, $\frac{12\ M\ R_4\ T\ R_2}{B\ T_9}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00016	.00005	.....	.....	
5,000	5,000	.00021	.00005	.00001	.00001	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00037	.00006	.....	.....	
9,000	9,000	.00042	.00005	.....	.....	
10,000	10,000	.00047	.00005	.00005	.00004	
11,000	11,000	.00052	.00005	.....	.....	
12,000	12,000	.00057	.00005	.....	.....	
13,000	13,000	.00062	.00005	.....	.....	
14,000	14,000	.00068	.00006	.....	.....	
15,000	15,000	.00074	.00006	.00009	.00004	
16,000	16,000	.00080	.00006	.....	.....	
17,000	17,000	.00085	.00005	.....	.....	
18,000	18,000	.00091	.00006	.....	.....	
19,000	19,000	.00098	.00007	.....	.....	
20,000	20,000	.00106	.00008	.00012	.00003	
21,000	21,000	.00112	.00006	.....	.....	
22,000	22,000	.00118	.00006	.....	.....	
23,000	23,000	.00123	.00005	.....	.....	
24,000	24,000	.00130	.00007	.....	.....	
25,000	25,000	.00138	.00008	.00021	.00009	
26,000	26,000	.00148	.00010	.....	.....	
27,000	27,000	.00156	.00008	.....	.....	
28,000	28,000	.00166	.00010	.....	.....	
29,000	29,000	.00178	.00012	.....	.....	
30,000	30,000	.00191	.00013	.00050	.00021	
31,000	31,000	.00208	.00017	.....	.....	
32,000	32,000	.00221	.00013	.....	.....	
33,000	33,000	.00241	.00020	.....	.....	
34,000	34,000	.00262	.00021	.....	.....	
35,000	35,000	.00292	.00030	.00130	.00080	
36,000	36,000	.00331	.00039	.....	.....	
37,000	37,000	.00361	.00030	.....	.....	
38,000	38,000	.00395	.00034	.....	.....	
39,000	39,000	.00442	.00047	.....	.....	
40,000	40,000	.00510	.00068	.00311	.00181	
51,650	51,650	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 838.

Marks, $^{12\,M\,B_{14}\,T\,R_2}_{B\,R_{12}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004			
3,000	3,000	.00010	.00006			
4,000	4,000	.00014	.00004			
5,000	5,000	.00018	.00004	0.		
6,000	6,000	.00022	.00004			
7,000	7,000	.00028	.00006			
8,000	8,000	.00032	.00004			
9,000	9,000	.00036	.00004			
10,000	10,000	.00042	.00006	0.		
11,000	11,000	.00050	.00008			
12,000	12,000	.00054	.00004			
13,000	13,000	.00060	.00006			
14,000	14,000	.00066	.00006			
15,000	15,000	.00072	.00006	.00006	.00006	
16,000	16,000	.00076	.00004			
17,000	17,000	.00084	.00008			
18,000	18,000	.00090	.00006			
19,000	19,000	.00096	.00006			
20,000	20,000	.00102	.00006	.00012	.00006	
21,000	21,000	.00106	.00004			
22,000	22,000	.00114	.00008			
23,000	23,000	.00120	.00006			
24,000	24,000	.00130	.00010			
25,000	25,000	.00140	.00010	.00022	.00010	
26,000	26,000	.00148	.00008			
27,000	27,000	.00158	.00010			
28,000	28,000	.00168	.00010			
29,000	29,000	.00180	.00012			
30,000	30,000	.00194	.00014	.00050	.00028	
31,000	31,000	.00212	.00018			
32,000	32,000	.00226	.00014			
33,000	33,000	.00254	.00028			
34,000	34,000	.00276	.00022			
35,000	35,000	.00310	.00034	.00140	.00090	
36,000	36,000	.00340	.00030			
37,000	37,000	.00380	.00040			
38,000	38,000	.00416	.00036			
39,000	39,000	.00478	.00062			
40,000	40,000	.00520	.00042			
60,800	60,800	----------	----------	.00320	.00180	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, NO. 16.

No. 4034.

Marks, $\frac{12\,M\,R_{16}\,T\,R_1}{M\,T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000350	.000050	.....	.....	
9,000	9,000	.000400	.000050	.....	.....	
10,000	10,000	.000445	.000045	0.	.....	
11,000	11,000	.000490	.000045	.....	.....	
12,000	12,000	.000545	.000055	0.	.....	
13,000	13,000	.000605	.000060	.....	.....	
14,000	14,000	.000670	.000065	.000015	.000015	
15,000	15,000	.000745	.000075	.....	.....	
16,000	16,000	.000815	.000070	.000045	.000030	
17,000	17,000	.000875	.000060	.....	.....	
18,000	18,000	.000960	.000085	.000090	.000045	
19,000	19,000	.001045	.000085	.....	.....	
20,000	20,000	.001145	.000100	.000145	.000055	
21,000	21,000	.001245	.000100	.....	.....	
22,000	22,000	.001345	.000100	.000220	.000075	
23,000	23,000	.001470	.000125	.....	.....	
24,000	24,000	.001620	.000150	.000345	.000125	
25,000	25,000	.001790	.000170	.000450	.000105	
29,310	29,310	.....	.....	.....	.....	Tensile strength.

Fractured 2″ from neck.
Appearance, granular with dark spots.
Specific gravity, 7.3149.
Hardness, 15.75.

No. 4035.

Marks, $\frac{12\ M\ R_{16}\ T\ R_1}{M\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000045	.000045			
3,000	3,000	.000085	.000040			
4,000	4,000	.000140	.000055			
5,000	5,000	.000180	.000040	0.		
6,000	6,000	.000220	.000040			
7,000	7,000	.000265	.000045			
8,000	8,000	.000315	.000050			
9,000	9,000	.000365	.000050			
10,000	10,000	.000415	.000050	0.		
11,000	11,000	.000460	.000045			
12,000	12,000	.000505	.000045	.000005	.000005	
13,000	13,000	.000550	.000045			
14,000	14,000	.000600	.000050	.000025	.000020	
15,000	15,000	.000670	.000070			
16,000	16,000	.000740	.000070	.000040	.000015	
17,000	17,000	.000800	.000060			
18,000	18,000	.000885	.000085	.000080	.000040	
19,000	19,000	.000950	.000065			
20,000	20,000	.001040	.000090	.000130	.000050	
21,000	21,000	.001135	.000095			
22,000	22,000	.001235	.000100	.000190	.000060	
23,000	23,000	.001335	.000100			
24,000	24,000	.001450	.000115	.000290	.000100	
25,000	25,000	.001595	.000145	.000370	.000080	
28,800	28,800					Tensile strength.

Fractured 2″.75 from neck.
Appearance, granular with dark spots.

TENACITY SPECIMENS.

General marks, 12 M R_{16} T R_1

No. of bar.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
232	M T_1 I	1.129	1.00	35,680	35,680	7.3397	17.99
233	M T_1 O	1.129	1.00	31,170	31,170	7.3378	15.91
234	M T_1 M	1.129	1.00	36,220	36,220	7.3699	17.62
235	M T_1 O X	1.129	1.00	33,490	33,490		

Appearance of fractures, uniform granular.

No. 844.

Marks, $\frac{12\,M\,R_{12}\,T\,R_1}{M\,T_8}$.
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
1,000	1,000	0.	0.	0.	0.	
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00012	.00003	.....	.....	
5,000	5,000	.00017	.00005	0.	.....	
6,000	6,000	.00020	.00003	.....	.....	
7,000	7,000	.00025	.00005	.....	.....	
8,000	8,000	.00030	.00005	.....	.....	
9,000	9,000	.00036	.00006	.....	.....	
10,000	10,000	.00041	.00005	0.	.....	
11,000	11,000	.00046	.00005	.....	.....	
12,000	12,000	.00051	.00005	.....	.....	
13,000	13,000	.00056	.00005	.....	.....	
14,000	14,000	.00061	.00005	.....	.....	
15,000	15,000	.00067	.00006	.00006	.00006	
16,000	16,000	.00074	.00007	.....	.....	
17,000	17,000	.00080	.00006	.....	.....	
18,000	18,000	.00085	.00005	.....	.....	
19,000	19,000	.00090	.00005	.....	.....	
20,000	20,000	.00097	.00007	.00010	.00004	
21,000	21,000	.00102	.00005	.....	.....	
22,000	22,000	.00109	.00007	.....	.....	
23,000	23,000	.00115	.00006	.....	.....	
24,000	24,000	.00120	.00005	.....	.....	
25,000	25,000	.00127	.00007	.00017	.00007	
26,000	26,000	.00133	.00006	.....	.....	
27,000	27,000	.00140	.00007	.....	.....	
28,000	28,000	.00148	.00008	.....	.....	
29,000	29,000	.00156	.00008	.....	.....	
30,000	30,000	.00166	.00010	.00030	.00013	
31,000	31,000	.00176	.00010	.....	.....	
32,000	32,000	.00185	.00009	.....	.....	
33,000	33,000	.00196	.00011	.....	.....	
34,000	34,000	.00210	.00014	.....	.....	
35,000	35,000	.00222	.00012	.00061	.00031	
36,000	36,000	.00240	.00018	.....	.....	
37,000	37,000	.00260	.00020	.....	.....	
38,000	38,000	.00280	.00020	.....	.....	
39,000	39,000	.00304	.00024	.....	.....	
40,000	40,000	.00342	.00038	.00152	.00091	
55,620	55,620	.....	.....	.....	.....	Ultimate streng

Failed by triple flexure.

No. 4049.

Marks, $\frac{12\ M\ R_{13}\ T\ R_2}{B\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050			
3,000	3,000	.000100	.000050			
4,000	4,000	.000150	.000050			
5,000	5,000	.000200	.000050	0.		
6,000	6,000	.000255	.000055			
7,000	7,000	.000320	.000065			
8,000	8,000	.000380	.000060			
9,000	9,000	.000430	.000050			
10,000	10,000	.000480	.000050	.000030	.000030	
11,000	11,000	.000550	.000070			
12,000	12,000	.000605	.000055	.000045	.000015	
13,000	13,000	.000675	.000070			
14,000	14,000	.000750	.000075	.000075	.000030	
15,000	15,000	.000825	.000075			
16,000	16,000	.000900	.000075	.000105	.000030	
17,000	17,000	.000980	.000080			
18,000	18,000	.001070	.000090	.000165	.000060	
19,000	19,000	.001175	.000105			
20,000	20,000	.001290	.000115	.000255	.000090	
21,000	21,000	.001390	.000100			
22,000	22,000	.001560	.000170	.000385	.000130	
23,000	23,000	.001730	.000170			
24,000	24,000	.001900	.000170	.000630	.000245	
24,900	24,900					Tensile strength.

Fractured at middle of stem. Appearance, coarse granular with stellar spots on one side, finer granular at the other.
Specific gravity, 7.3209.
Hardness, 14.69.

No. 4050.

Marks, $\frac{12\,M\,R_{16}\,T\,R_2}{B.\,T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000040	.000040	.....	.....	
3,000	3,000	.000090	.000050	.....	.....	
4,000	4,000	.000140	.000050	.....	.....	
5,000	5,000	.000190	.000050	0.	.....	
6,000	6,000	.000240	.000050	.....	.....	
7,000	7,000	.000295	.000055	.....	.....	
8,000	8,000	.000350	.000055	.....	.....	
9,000	9,000	.000405	.000055	.....	.....	
10,000	10,000	.000460	.000055	.000010	.000010	
11,000	11,000	.000515	.000055	.....	.....	
12,000	12,000	.000585	.000070	.000035	.000025	
13,000	13,000	.000645	.000060	.....	.....	
14,000	14,000	.000710	.000065	.000050	.000015	
15,000	15,000	.000790	.000080	.....	.....	
16,000	16,000	.000865	.000075	.000090	.000040	
17,000	17,000	.000950	.000085	.....	.....	
18,000	18,000	.001050	.000100	.000150	.000060	
19,000	19,000	.001150	.000100	.....	.....	
20,000	20,000	.001260	.000110	.000240	.000090	
21,000	21,000	.001400	.000110	.....	.....	
22,000	22,000	.001525	.000125	.000370	.000130	
23,000	23,000	.001685	.000160	.....	.....	
24,000	24,000	.001875	.000190	.000600	.000230	
25,000	25,000	.002100	.000225	.000760	.000160	
30,210	30,210	.....	.....	.....	.....	Tensile strength.

Fractured 10¼″ from neck. Appearance, medium coarse gran**ul** with coarser belt across one side of surface.

TENACITY SPECIMENS.

General marks, 12 M R_{16} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*		
3126	B T_3 I	1.129	1.00	32,990	32,990	7.3140	14.12
3127	B T_4 O	1.129	1.00	34,020	34,020	7.3141	14.12
3128	B T_5 M	1.129	1.00	31,510	31,510	7.3314	15.06
3129	B L_6 I	1.129	1.00	34,070	34,070	7.3398	14.69
3130	B L_7 O	1.129	1.00	34,730	34,730	7.3294	14.98
3131	B L_8 M	1.129	1.00	37,640	37,640	7.3332	15.20

No. 843.

Marks, $\frac{12\ M\ R_{16}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remark
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00028	.00004	.....	.....	
8,000	8,000	.00034	.00006	.....	.....	
9,000	9,000	.00040	.00006	.....	.....	
10,000	10,000	.00044	.00004	0.	.....	
11,000	11,000	.00048	.00004	.....	.....	
12,000	12,000	.00052	.00004	.....	.....	
13,000	13,000	.00058	.00006	.....	.....	
14,000	14,000	.00064	.00006	.....	.....	
15,000	15,000	.00068	.00004	.00004	.00004	
16,000	16,000	.00074	.00006	.....	.....	
17,000	17,000	.00080	.00006	.....	.....	
18,000	18,000	.00084	.00004	.....	.....	
19,000	19,000	.00090	.00006	.....	.....	
20,000	20,000	.00096	.00006	.00010	.00006	
21,000	21,000	.00100	.00004	.....	.....	
22,000	22,000	.00108	.00008	.....	.....	
23,000	23,000	.00114	.00006	.....	.....	
24,000	24,000	.00120	.00006	.....	.....	
25,000	25,000	.00128	.00008	.00024	.00014	
26,000	26,000	.00140	.00012	.....	.....	
27,000	27,000	.00150	.00010	.....	.....	
28,000	28,000	.00160	.00010	.....	.....	
29,000	29,000	.00172	.00012	.....	.....	
30,000	30,000	.00184	.00012	.00050	.00026	
31,000	31,000	.00208	.00024	.....	.....	
32,000	32,000	.00224	.00016	.....	.....	
33,000	33,000	.00246	.00022	.....	.....	
34,000	34,000	.00270	.00024	.....	.....	
35,000	35,000	.00308	.00038	.00144	.00094	
36,000	36,000	.00344	.00036	.....	.....	
37,000	37,000	.00378	.00034	.....	.....	
38,000	38,000	.00430	.00052	.....	.....	
39,000	39,000	.00476	.00046	.....	.....	
40,000	40,000	.00528	.00052	.00370	.00226	
63,250	63,250	.....	.....	.....	.....	Ultimate stren

Failed by triple flexure.

No. 4039.

Marks, $^{12\ M\ R_{17}\ T\ R_1}_{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000045	.000045	.....	.....	
3,000	3,000	.000100	.000055	.....	.....	
4,000	4,000	.000145	.000045	.....	.....	
5,000	5,000	.000190	.000045	0.	.....	
6,000	6,000	.000240	.000050	.....	.....	
7,000	7,000	.000290	.000050	.....	.....	
8,000	8,000	.000340	.000050	.....	.....	
9,000	9,000	.000395	.000055	.....	.....	
10,000	10,000	.000450	.000055	.000025	.000025	
11,000	11,000	.000505	.000055	.....	.....	
12,000	12,000	.000560	.000055	.000040	.000015	
13,000	13,000	.000620	.000060	.....	.....	
14,000	14,000	.000685	.000065	.000055	.000015	
15,000	15,000	.000750	.000065	.....	.....	
16,000	16,000	.000825	.000075	.000090	.000035	
17,000	17,000	.000890	.000065	.....	.....	
18,000	18,000	.000965	.000075	.000130	.000040	
19,000	19,000	.001060	.000095	.....	.....	
20,000	20,000	.001150	.000090	.000195	.000065	
21,000	21,000	.001265	.000115	.....	.....	
22,000	22,000	.001385	.000120	.000290	.000095	
23,000	23,000	.001520	.000135	.....	.....	
24,000	24,000	.001665	.000145	.000450	.000160	
25,000	25,000	.001840	.000175	.000555	.000100	
28,270	28,270	.....	.....	.....	.....	Tensile strength.

Fractured 2¼″ from neck.
Appearance, granular with dark spots.

TENACITY SPECIMENS.

General marks, 12 M R_{17} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4397	M T_3 I	1.129	1.00	35,310	35,310	7.3430	15.83
4398	M T_4 O	1.129	1.00	34,300	34,300	7.3358	14.98
4399	M T_5 M	1.129	1.00	33,960	33,960	7.3292	14.90
4400	M T_3 OX	1.129	1.00	34,510	34,510	.....	.....

No. 847.

Marks, $\frac{12\ M\ B_1, T\ B_1}{M\ T_2\ X}$
Length, 12″.
Diameter, 1″.129.
Sectional area, **1 per square inch.**
Charged length, 10″.

Applied loads. Per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	0.	0.	0.	0.	Initial load.
1,000	.00003	.00003			
2,000	.00009	.00006			
3,000	.00014	.00005			
4,000	.00019	.00005	0.		
5,000	.00024	.00005			
6,000	.00029	.00005			
7,000	.00034	.00005			
8,000	.00039	.00005			
9,000	.00044	.00005	.00001	.00001	
10,000	.00049	.00005			
11,000	.00054	.00005			
12,000	.00059	.00005			
13,000	.00064	.00005			
14,000	.00070	.00006	.00008	.00007	
15,000	.00077	.00007			
16,000	.00082	.00005			
17,000	.00088	.00006			
18,000	.00094	.00006			
19,000	.00100	.00006	.00012	.00004	
20,000	.00108	.00008			
21,000	.00113	.00005			
22,000	.00120	.00007			
23,000	.00126	.00006			
24,000	.00133	.00007	.00022	.00010	
25,000	.00142	.00009			
26,000	.00150	.00008			
27,000	.00158	.00008			
28,000	.00168	.00010			
29,000	.00180	.00012	.00033	.00021	
30,000	.00193	.00013			
31,000	.00209	.00016			
32,000	.00222	.00013			
33,000	.00243	.00021			
34,000	.00267	.00024	.00103	.00060	
35,000	.00290	.00023			
36,000	.00322	.00032			
37,000	.00357	.00035			
38,000	.00393	.00036			
39,000	.00437	.00044	.00249	.00146	
40,000					Ultimate strength.
51,980					

by triple flexure.

No. 4036.

Marks, $^{12\,M}_{B}\,R_4\,T\,R_2$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000355	.000050	.....	.....	
9,000	9,000	.000425	.000070	.....	.....	
10,000	10,000	.000485	.000060	.000020	.000020	
11,000	11,000	.000540	.000055	.....	.....	
12,000	12,000	.000610	.000070	.000045	.000025	
13,000	13,000	.000675	.000065	.....	.....	
14,000	14,000	.000740	.000065	.000070	.000025	
15,000	15,000	.000810	.000070	.....	.....	
16,000	16,000	.000905	.000095	.000120	.000050	
17,000	17,000	.000990	.000085	.....	.....	
18,000	18,000	.001090	.000100	.000190	.000070	
19,000	19,000	.001190	.000100	.....	.....	
20,000	20,000	.001325	.000135	.000290	.000100	
21,000	21,000	.001490	.000165	.....	.....	
22,000	22,000	.001640	.000150	.000485	.000195	
23,000	23,000	.001840	.000200	.....	.....	
24,000	24,000	.002065	.000225	.000760	.000275	
25,000	25,000	.002360	.000295	.000990	.000230	
28,210	28,210	.....	.....	.....	.....	Tensile strength.

Fractured 4¼″ from neck.
Appearance, fine granular, with coarser granulation near circumference at one side.
Specific gravity, 7.3109.
Hardness, 13.46.

No. 4037.

Marks, $^{12\,M\,R_{17}\,T\,R_2}_{B\,T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000105	.000055	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000210	.000055	0.	.....	
6,000	6,000	.000260	.000050	.....	.....	
7,000	7,000	.000330	.000070	.....	.....	
8,000	8,000	.000390	.000060	.....	.....	
9,000	9,000	.000445	.000055	.....	.....	
10,000	10,000	.000505	.000060	.000040	.000040	
11,000	11,000	.000570	.000065	.....	.....	
12,000	12,000	.000640	.000070	.000060	.000020	
13,000	13,000	.000715	.000075	.....	.....	
14,000	14,000	.000800	.000085	.000095	.000035	
15,000	15,000	.000885	.000085	.....	.....	
16,000	16,000	.000990	.000105	.000150	.000055	
17,000	17,000	.001080	.000090	.....	.....	
18,000	18,000	.001190	.000110	.000240	.000090	
19,000	19,000	.001335	.000145	.....	.....	
20,000	20,000	.001465	.000130	.000390	.000150	
21,000	21,000	.001675	.000210	.....	.....	
22,000	22,000	.001865	.000190	.000630	.000240	
23,000	23,000	.002065	.000200	.....	.....	
24,000	24,000	.002405	.000340	.001015	.000385	
25,000	25,000	.002740	.000335	.001260	.000245	
29,530	29,530	.....	.....	.....	.....	Tensile strength.

Fractured 8″ from the neck.
Appearance, granular, varying in size.

TENACITY SPECIMENS.

General marks, 12 M R_{17} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4391	B T_3 I	1.129	1.00	36,200	36,200	.....	.....
4392	B T_4 O	1.129	1.00	36,020	36,020	.....	.....
4393	B T_5 M	1.129	1.00	34,310	34,310	.....	.....
4394	B L_6 I	1.129	1.00	31,990	31,990	7.3225	14.90
4395	B L_7 O	1.129	1.00	36,970	36,970	7.3124	15.13
4396	B L_8 M	1.129	1.00	34,930	34,930	7.2860	13.99

No. 845.

Marks, $\frac{12\,M\,R_1, T\,R_2}{B\,T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00010	.00005			
4,000	4,000	.00016	.00006			
5,000	5,000	.00021	.00005	.00001	.00001	
6,000	6,000	.00026	.00005			
7,000	7,000	.00031	.00005			
8,000	8,000	.00037	.00006			
9,000	9,000	.00042	.00005			
10,000	10,000	.00048	.00006	.00002	.00001	
11,000	11,000	.00052	.00004			
12,000	12,000	.00058	.00006			
13,000	13,000	.00065	.00007			
14,000	14,000	.00071				
15,000	15,000	.00076	.00005	.00003	.00006	
16,000	16,000	.00082	.00006			
17,000	17,000	.00089	.00007			
18,000	18,000	.00095	.00006			
19,000	19,000	.00101	.00006			
20,000	20,000	.00108	.00007	.00013	.00005	
21,000	21,000	.00115	.00007			
22,000	22,000	.00124	.00009			
23,000	23,000	.00133	.00009			
24,000	24,000	.00142	.00009			
25,000	25,000	.00151	.00009	.00032	.00019	
26,000	26,000	.00163	.00012			
27,000	27,000	.00176	.00013			
28,000	28,000	.00190	.00014			
29,000	29,000	.00210	.00020			
30,000	30,000	.00229	.00019	.00085	.00053	
31,000	31,000	.00255	.00026			
32,000	32,000	.00275	.00020			
33,000	33,000	.00305	.00030			
34,000	34,000	.00345	.00040			
35,000	35,000	.00382	.00037	.00209	.00124	
36,000	36,000	.00432	.00050			
37,000	37,000	.00476	.00044			
38,000	38,000	.00532	.00056			
39,000	39,000	.00588	.00056			
40,000	40,000	.00648	.00060	.00440	.00231	
50,600	50,600					Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, NO. 18.

No. 4074.

Marks, $\frac{12\ M\ R_{18}\ T\ R_1}{M\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000350	.000050	.....	.....	
9,000	9,000	.000400	.000050	.....	.....	
10,000	10,000	.000460	.000060	.000015	.000015	
11,000	11,000	.000530	.000070	.....	.....	
12,000	12,000	.000590	.000060	.000035	.000020	
13,000	13,000	.000645	.000055	.....	.....	
14,000	14,000	.000705	.000060	.000050	.000015	
15,000	15,000	.000785	.000080	.....	.....	
16,000	16,000	.000850	.000065	.000085	.000035	
17,000	17,000	.000935	.000085	.....	.....	
18,000	18,000	.001010	.000075	.000135	.000050	
19,000	19,000	.001100	.000090	.....	.....	
20,000	20,000	.001190	.000090	.000185	.000050	
21,000	21,000	.001290	.000100	.....	.....	
22,000	22,000	.001400	.000110	.000260	.000075	
23,000	23,000	.001540	.000140	.....	.....	
24,000	24,000	.001655	.000115	.000390	.000130	
25,000	25,000	.001825	.000170	.000466	.000070	
29,630	29,630	.....	.....	.....	.....	Tensile strength.

Fractured 3″ from the neck.
Appearance, granular mottled.
Specific gravity, 7.2990.
Hardness, 16.15.

No. 849.

Marks, $\frac{12\ M\ R_{10}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	.00002	.00002	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00032	.00006	.....	.....	
8,000	8,000	.00036	.00004	.....	.....	
9,000	9,000	.00040	.00004	.....	.....	
10,000	10,000	.00046	.00006	.00004	.00002	
11,000	11,000	.00052	.00006	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00062	.00004	.....	.....	
14,000	14,000	.00068	.00006	.....	.....	
15,000	15,000	.00074	.00006	.00008	.00004	
16,000	16,000	.00080	.00006	.....	.....	
17,000	17,000	.00086	.00006	.....	.....	
18,000	18,000	.00092	.00006	.....	.....	
19,000	19,000	.00098	.00006	.....	.....	
20,000	20,000	.00104	.00006	.00014	.00006	
21,000	21,000	.00112	.00008	.....	.....	
22,000	22,000	.00120	.00008	.....	.....	
23,000	23,000	.00126	.00006	.....	.....	
24,000	24,000	.00132	.00006	.....	.....	
25,000	25,000	.00140	.00008	.00028	.00014	
26,000	26,000	.00150	.00010	.....	.....	
27,000	27,000	.00160	.00010	.....	.....	
28,000	28,000	.00170	.00010	.....	.....	
29,000	29,000	.00180	.00010	.....	.....	
30,000	30,000	.00192	.00012	.00052	.00024	
31,000	31,000	.00210	.00018	.....	.....	
32,000	32,000	.00230	.00020	.....	.....	
33,000	33,000	.00252	.00022	.....	.....	
34,000	34,000	.00274	.00022	.....	.....	
35,000	35,000	.00304	.00030	.00136	.00084	
36,000	36,000	.00336	.00032	.....	.....	
37,000	37,000	.00366	.00030	.....	.....	
38,000	38,000	.00404	.00038	.....	.....	
39,000	39,000	.00450	.00046	.....	.....	
40,000	40,000	.00500	.00050	.00306	.00170	
58,250	58,250	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4048.

Marks, $\frac{12\,M\,R_{19}\,T\,R_1}{M\,T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000040	.000040	.....	.....	
3,000	3,000	.000095	.000055	.....	.....	
4,000	4,000	.000140	.000045	.....	.....	
5,000	5,000	.000190	.000050	0.	.....	
6,000	6,000	.000240	.000050	.....	.....	
7,000	7,000	.000295	.000055	.....	.....	
8,000	8,000	.000350	.000055	.....	.....	
9,000	9,000	.000405	.000055	.....	.....	
10,000	10,000	.000460	.000055	.000035	.000035	
11,000	11,000	.000535	.000075	.....	.....	
12,000	12,000	.000590	.000055	.000050	.000015	
13,000	13,000	.000650	.000060	.....	.....	
14,000	14,000	.000725	.000075	.000085	.000015	
15,000	15,000	.000790	.000065	.....	.....	
16,000	16,000	.000855	.000065	.000095	.000030	
17,000	17,000	.000940	.000085	.....	.....	
18,000	18,000	.001015	.000075	.000140	.000045	
19,000	19,000	.001105	.000090	.....	.....	
20,000	20,000	.001200	.000095	.000205	.000065	
21,000	21,000	.001305	.000105	.....	.....	
22,000	22,000	.001420	.000115	.000300	.000095	
23,000	23,000	.001560	.000140	.....	.....	
24,000	24,000	.001710	.000150	.000455	.000155	
25,000	25,000	.001905	.000195	.000565	.000110	
29,620	29,620	.....	.....	.....	.....	Tensile strength.

Fractured 2″.25 from neck.
Appearance, medium coarse granular; contains dark spots.

TENACITY SPECIMENS.

General marks, 12 M R_{19} T R_1.

No of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
3122	M T_3 I	1.129	1.00	33,390	33,300	7.3219	16.56
3123	M T_4 O	1.129	1.00	31,610	31,610	7.3205	15.91
3124	M T_5 M	1.129	1.00	31,040	31,040	7.3276	16.56
3125	M T_8 O X	1.129	1.00	33,800	33,800	.....	.....

No. 839.

Marks, $\frac{12\ M\ R_2\ T\ R_2}{B\ T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007			
3,000	3,000	.00011	.00004			
4,000	4,000	.00016	.00005			
5,000	5,000	.00021	.00005	.00001	.00001	
6,000	6,000	.00028	.00007			
7,000	7,000	.00032	.00004			
8,000	8,000	.00038	.00006			
9,000	9,000	.00042	.00004			
10,000	10,000	.00048	.00006	.00005	.00004	
11,000	11,000	.00053	.00005			
12,000	12,000	.00059	.00006			
13,000	13,000	.00067	.00008			
14,000	14,000	.00072	.00005			
15,000	15,000	.00078	.00006	.00009	.00004	
16,000	16,000	.00084	.00006			
17,000	17,000	.00090	.00006			
18,000	18,000	.00098	.00008			
19,000	19,000	.00104	.00006			
20,000	20,000	.00111	.00007	.00016	.00007	
21,000	21,000	.00118	.00007			
22,000	22,000	.00124	.00006			
23,000	23,000	.00133	.00009			
24,000	24,000	.00142	.00009			
25,000	25,000	.00151	.00009	.00030	.00014	
26,000	26,000	.00162	.00011			
27,000	27,000	.00173	.00011			
28,000	28,000	.00186	.00013			
29,000	29,000	.00201	.00015			
30,000	30,000	.00219	.00018	.00072	.00042	
31,000	31,000	.00239	.00020			
32,000	32,000	.00258	.00019			
33,000	33,000	.00281	.00023			
34,000	34,000	.00313	.00032			
35,000	35,000	.00347	.00034	.00173	.00101	
36,000	36,000	.00400	.00053			
37,000	37,000	.00426	.00026			
38,000	38,000	.00465	.00039			
39,000	39,000	.00515	.00050			
40,000	40,000	.00565	.00050	.00361	.00188	
51,800	51,800					Ultimate strength.

Failed by triple flexure.

No. 840.

g, $12\,M\,R_{18}\,T\,R_2$ / $B\,R_{18}$
h, 10″.
er, 1″.129.
l area, 1 square inch.
length, 5″.

sds. / square ch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
nds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
000	0.	0.	0.	0.	Initial load.
000	.00006	.00006			
000	.00012	.00006			
000	.00016	.00004			
000	.00020	.00004	0.		
000	.00026	.00006			
000	.00030	.00 04			
000	.00036	.00006			
000	.00040	.00004			
000	.00046	.00006	.00002	.00002	
000	.00050	.00004			
000	.00058	.00008			
000	.00066	.00008			
000	.00072	.00006			
000	.00078	.00006	.00014	.00012	
000	.00082	.00004			
000	.00086	.00004			
000	.00092	.00006			
000	.00098	.00006			
000	.00102	.00004	.00020	.00006	
000	.00110	.00008			
000	.00120	.00010			
000	.00128	.00008			
000	.00138	.00010			
000	.00150	.00012	.00038	.00018	
000	.00160	.00010			
000	.00172	.00012			
000	.00182	.00010			
000	.00200	.00018			
000	.00220	.00020	.00072	.00034	
000	.00242	.00022			
000	.00260	.00018			
000	.00290	.00030			
000	.00314	.00024			
000	.00360	.00040	.00186	.00114	
000	.00396	.00036			
000	.00430	.00034			
000	.00470	.00040			
000	.00514	.00044			
000	.00570	.00056	.00380	.00194	
000					Ultimate strength.
51, 900					

y triple flexure.

CAST-IRON BODY, NO. 20.

No. 4078.

Marks, $^{12\ M\ R_{20}\ TR^1}_{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000105	.000050	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000200	.000045	.000005	.000005	
6,000	6,000	.000255	.000055	.....	.....	
7,000	7,000	.000305	.000050	.....	.....	
8,000	8,000	.000360	.000055	.....	.....	
9,000	9,000	.000410	.000050	.....	.....	
10,000	10,000	.000465	.000055	.000030	.000025	
11,000	11,000	.000530	.000065	.....	.....	
12,000	12,000	.000580	.000050	.000035	.000005	
13,000	13,000	.000650	.000070	.....	.....	
14,000	14,000	.000710	.000060	.000055	.000020	
15,000	15,000	.000770	.000060	.....	.....	
16,000	16,000	.000850	.000080	.000085	.000030	
17,000	17,000	.000920	.000070	.....	.....	
18,000	18,000	.001000	.000080	.000115	.000030	
19,000	19,000	.001085	.000085	.....	.....	
20,000	20,000	.001185	.000100	.000170	.000055	
21,000	21,000	.001270	.000085	.....	.....	
22,000	22,000	.001390	.000120	.000260	.000090	
23,000	23,000	.001500	.000110	.....	.....	
24,000	24,000	.001635	.000135	.000370	.000110	
25,000	25,000	.001790	.000155	.000450	.000080	
29,080	29,080	.....	.....	.....	.....	Tensile strength.

Fractured 2″ from neck.
Appearance, granular mottled.

TENACITY SPECIMENS.

General marks, 12 M R_{20} T R_1

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4418	M T_3 I	1.129	1.00	34,150	34,150	7.3191	17.17
4419	M T_4 O	1.129	1.00	31,700	31,700	7.3282	16.07
4420	M T_5 M	1.129	1.00	32,450	32,450	7.3324	16.90
4421	M T_6 O	1.129	1.00	33,720	33,720	7.3015	15.59

No. 851.

arks, 12 M R_{pp} T R_1 M T_1
ngth, 12″.
ameter, 1″.129.
tional area, 1 square inch.
ged length, 10″.

pplied loads. L	Per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
a.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	0.	0.	0.	0.	Initial load.
	2,000	.00003	.00003			
	3,000	.00008	.00005			
	4,000	.00012	.00004			
	5,000	.00016	.00004	0.		
	6,000	.00019	.00003			
	7,000	.00024	.00005			
	8,000	.00029	.00005			
	9,000	.00034	.00005			
	10,000	.00039	.00005	.00001	.00001	
	11,000	.00044	.00005			
	12,000	.00050	.00006			
	13,000	.00055	.00005			
	14,000	.00060	.00005			
	15,000	.00065	.00005	.00005	.00004	
	16,000	.00071	.00006			
	17,000	.00076	.00005			
	18,000	.00081	.00005			
	19,000	.00088	.00007			
	20,000	.00092	.00004	.00009	.00004	
	21,000	.00099	.00007			
	22,000	.00104	.00005			
	23,000	.00111	.00007			
	24,000	.00118	.00007			
	25,000	.00123	.00005	.00014	.00005	
	26,000	.00130	.00007			
	27,000	.00138	.00008			
	28,000	.00144	.00006			
	29,000	.00150	.00006			
	30,000	.00159	.00009	.00024	.00010	
	31,000	.00170	.00011			
	32,000	.00178	.00008			
	33,000	.00188	.00010			
	34,000	.00198	.00010			
	35,000	.00210	.00012	.00048	.00024	
	36,000	.00226	.00016			
	37,000	.00240	.00014			
	38,000	.00257	.00017			
	39,000	.00278	.00021			
	40,000	.00300	.00022	.00110	.00062	
	56,650					Ultimate strength.

led by triple flexure.

No. 4076.

Marks, $\frac{12\ M\ R_{20}\ T\ R_2}{B\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

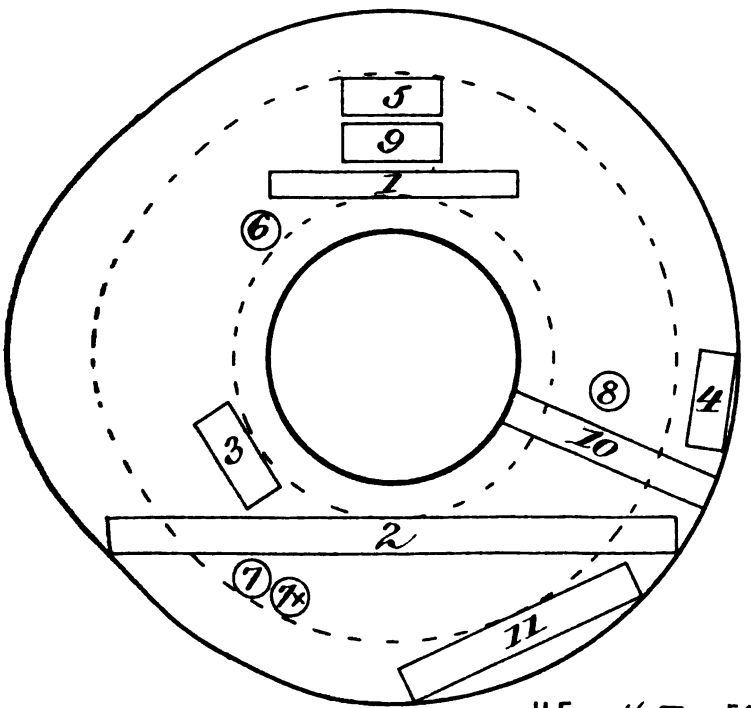
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000105	.000050	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000205	.000050	0.	.....	
6,000	6,000	.000260	.000055	.....	.....	
7,000	7,000	.000310	.000050	.....	.....	
8,000	8,000	.000370	.000060	.....	.....	
9,000	9,000	.000425	.000055	.....	.....	
10,000	10,000	.000500	.000075	.000025	.000025	
11,000	11,000	.000550	.000050	.....	.....	
12,000	12,000	.000610	.000060	.000040	.000015	
13,000	13,000	.000680	.000070	.....	.....	
14,000	14,000	.000750	.000070	.000070	.000030	
15,000	15,000	.000840	.000090	.....	.....	
16,000	16,000	.000910	.000070	.000115	.000045	
17,000	17,000	.001005	.000095	.....	.....	
18,000	18,000	.001105	.000100	.000170	.000055	
19,000	19,000	.001210	.000105	.....	.....	
20,000	20,000	.001320	.000110	.000265	.000095	
21,000	21,000	.001460	.000140	.....	.....	
22,000	22,000	.001625	.000165	.000430	.000165	
23,000	23,000	.001820	.000195	.....	.....	
24,000	24,000	.002060	.000240	.000700	.000270	
25,000	25,000	.002310	.000250	.000880	.000180	
30,590	30,590	.....	.....	.....	.....	Tensile strength.

Fractured 11″ from neck.
Appearance, uniform granular.
Specific gravity, 7.3163.
Hardness, 14.33.

12-inch B.L. Rifled Mortars.

Cast Iron Body No. 20.

Specimens from Breech disc.



H Ex. 165 51 2

No. 4077.

Marks, $\frac{12\ M\ R_{20}\ T\ R_2}{B\ T_{11}}$
Length of stem, 10″.
Diameter, 1″.128.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00021	.00005	.....	.....	
6,000	6,000	.00027	.00006	0.	.....	
7,000	7,000	.00033	.00006	.....	.....	
8,000	8,000	.00040	.00007	.....	.....	
9,000	9,000	.00048	.00008	.....	.....	
10,000	10,000	.00053	.00005	.00003	.00003	
11,000	11,000	.00058	.00005	.....	.....	
12,000	12,000	.00065	.00007	.00008	.00005	
13,000	13,000	.00072	.00007	.....	.....	
14,000	14,000	.00081	.00009	.00010	.00002	
15,000	15,000	.00088	.00007	.....	.....	
16,000	16,000	.00098	.00010	.00013	.00003	
17,000	17,000	.00107	.00009	.....	.....	
18,000	18,000	.00118	.00011	.00022	.00009	
19,000	19,000	.00130	.00012	.....	.....	
20,000	20,000	.00142	.00012	.00033	.00011	
21,000	21,000	.00158	.00016	.....	.....	
22,000	22,000	.00178	.00020	.00053	.00020	
23,000	23,000	.00198	.00020	.....	.....	
24,000	24,000	.00228	.00030	.00088	.00035	
25,000	25,000	.00270	.00042	.00120	.00032	
31,410	31,410	.....	.....	.....	.....	Tensile strength.

Fractured 3″.4 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{20} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4411	B T_3 I	1.129	1.00	32,510	32,510	.....	.....
4412	B T_4 O	1.129	1.00	33,690	33,690	.....	.....
4413	B T_5 M	1.129	1.00	33,610	33,610	.....	.....
4414	B L_6 I	1.129	1.00	34,990	34,990	7.3191	15.43
4415	B L_7 O	1.129	1.00	33,840	33,840	7.3118	14.98
4416	B L_8 M	1.129	1.00	33,340	33,340	7.3237	15.36
4417	B T_9 M	1.129	1.00	31,970	31,970	.....	.....

No. 852.

Marks, $\frac{12\,M\,R^{30}\,T\,R^{2}}{B\,T^{1}}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	0.	.....	
6,000	6,000	.00025	.00005	.....	.....	
7,000	7,000	.00030	.00005	.....	.....	
8,000	8,000	.00035	.00005	.....	.....	
9,000	9,000	.00040	.00005	.....	.....	
10,000	10,000	.00045	.00005	.00001	.00001	
11,000	11,000	.00052	.00007	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00063	.00005	.....	.....	
14,000	14,000	.00070	.00007	.....	.....	
15,000	15,000	.00075	.00005	.00008	.00007	
16,000	16,000	.00082	.00007	.....	.....	
17,000	17,000	.00090	.00008	.....	.....	
18,000	18,000	.00098	.00008	.....	.....	
19,000	19,000	.00104	.00006	.....	.....	
20,000	20,000	.00110	.00006	.00015	.00007	
21,000	21,000	.00119	.00009	.....	.....	
22,000	22,000	.00127	.00008	.....	.....	
23,000	23,000	.00137	.00010	.....	.....	
24,000	24,000	.00143	.00006	.....	.....	
25,000	25,000	.00152	.00009	.00030	.00015	
26,000	26,000	.00164	.00012	.....	.....	
27,000	27,000	.00177	.00013	.....	.....	
28,000	28,000	.00190	.00013	.....	.....	
29,000	29,000	.00205	.00015	.....	.....	
30,000	30,000	.00222	.00017	.00068	.00038	
31,000	31,000	.00245	.00023	.....	.....	
32,000	32,000	.00265	.00020	.....	.....	
33,000	33,000	.00295	.00030	.....	.....	
34,000	34,000	.00325	.00030	.....	.....	
35,000	35,000	.00356	.00031	.00162	.00094	
36,000	36,000	.00405	.00049	.....	.....	
37,000	37,000	.00435	.00030	.....	.....	
38,000	38,000	.00470	.00035	.....	.....	
39,000	39,000	.00535	.00063	.....	.....	
40,000	40,000	.00598	.00063	.00369	.00207	
51,290	51,290	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.
Specific gravity, 7,3083.
Hardness, 15.91.

No. 853.

Marks, $\frac{12\ M\ R_{20}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00002	.00002			
3,000	3,000	.00008	.00006			
4,000	4,000	.00014	.00006			
5,000	5,000	.00020	.00006	0.		
6,000	6,000	.00024	.00004			
7,000	7,000	.00028	.00004			
8,000	8,000	.00032	.00004			
9,000	9,000	.00036	.00004			
10,000	10,000	.00042	.00006	0.		
11,000	11,000	.00048	.00006			
12,000	12,000	.00054	.00006			
13,000	13,000	.00058	.00004			
14,000	14,000	.00062	.00004			
15,000	15,000	.00068	.00006	.00004	.00004	
16,000	16,000	.00076	.00008			
17,000	17,000	.00082	.00006			
18,000	18,000	.00088	.00006			
19,000	19,000	.00094	.00006			
20,000	20,000	.00100	.00006	.00010	.00006	
21,000	21,000	.00106	.00006			
22,000	22,000	.00112	.00006			
23,000	23,000	.00120	.00008			
24,000	24,000	.00126	.00006			
25,000	25,000	.00136	.00010	.00024	.00014	
26,000	26,000	.00144	.00008			
27,000	27,000	.00156	.00012			
28,000	28,000	.00168	.00012			
29,000	29,000	.00180	.00012			
30,000	30,000	.00196	.00016	.00054	.00030	
31,000	31,000	.00216	.00020			
32,000	32,000	.00236	.00020			
33,000	33,000	.00260	.00024			
34,000	34,000	.00288	.00028			
35,000	35,000	.00326	.00038	.00150	.00096	
36,000	36,000	.00354	.00028			
37,000	37,000	.00394	.00040			
38,000	38,000	.00434	.00040			
39,000	39,000	.00484	.00050			
40,000	40,000	.00540	.00056	.00340	.00190	
61,920	61,920					Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, NO. 21.

No. 4084.

Marks, $\frac{12\,M\,R_{21}\,T\,R_1}{M\,T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000310	.000060	.....	.....	
8,000	8,000	.000360	.000050	.....	.....	
9,000	9,000	.000410	.000050	.....	.....	
10,000	10,000	.000470	.000060	.000005	.000005	
11,000	11,000	.000530	.000060	.....	.....	
12,000	12,000	.000595	.000065	.000010	.000005	
13,000	13,000	.000650	.000055	.....	.....	
14,000	14,000	.000715	.000065	.000035	.000025	
15,000	15,000	.000785	.000070	.....	.....	
16,000	16,000	.000860	.000075	.000060	.000025	
17,000	17,000	.000930	.000070	.....	.....	
18,000	18,000	.001020	.000090	.000105	.000045	
19,000	19,000	.001105	.000085	.....	.....	
20,000	20,000	.001205	.000100	.000165	.000060	
21,000	21,000	.001305	.000100	.....	.....	
22,000	22,000	.001450	.000145	.000260	.000105	
23,000	23,000	.001595	.000145	.....	.....	
24,000	24,000	.001760	.000165	.000440	.000180	
25,000	25,000	.002005	.000245	.000595	.000155	
28,350	28,350	.....	.....	.....	.....	Tensile strength.

Fractured 9″.5 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

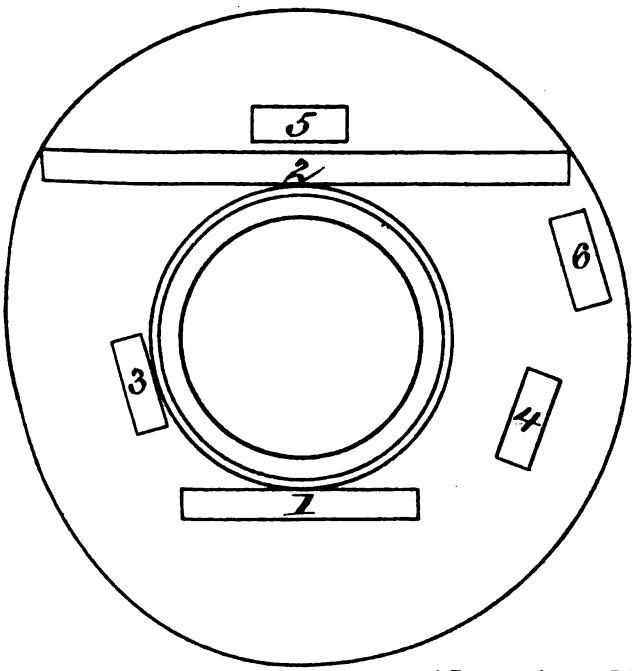
General marks, 12 M R_{21} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4429	M T_2 I	1.129	1.00	33,610	33,610	7.3105	15.91
4430	M T_4 O	1.129	1.00	31,520	31,520	7.3122	15.43
4431	M T_5 M	1.129	1.00	31,700	31,700	7.3278	16.48
4432	M T_6 O	1.129	1.00	34,800	34,800	7.3158	15.99

12-inch B.L. Rifled Mortars.

Cast Iron Bodies Nos. 21, 22, 23 24, 25, 26, 27, 28, 29, 30, 31.

Specimens from Muzzle discs.



H Ex. 165 51 2

No. 856.

Marks, $^{12\ M\ R_{21}\ T\ E_1}_{M\ T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
		0.	0.	0.	0.	Initial load.
1,000	1,000	.00005	.00005			
2,000	2,000	.00011	.00006			
3,000	3,000	.00015	.00004			
4,000	4,000	.00020	.00005	.00001	.00001	
5,000	5,000	.00025	.00005			
6,000	6,000	.00031	.00006			
7,000	7,000	.00036	.00005			
8,000	8,000	.00041	.00005			
9,000	9,000	.00047	.00006	.00002	.00002	
10,000	10,000	.00052	.00005			
11,000	11,000	.00057	.00005			
12,000	12,000	.00063	.00006			
13,000	13,000	.00068	.00005			
14,000	14,000	.00072	.00004	.00007	.00002	
15,000	15,000	.00079	.00007			
16,000	16,000	.00085	.00006			
17,000	17,000	.00091	.00006			
18,000	18,000	.00097	.00006			
19,000	19,000	.00102	.00005	.00010	.00003	
20,000	20,000	.00108	.00006			
21,000	21,000	.00113	.00005			
22,000	22,000	.00121	.00008			
23,000	23,000	.00128	.00007			
24,000	24,000	.00134	.00006	.00018	.00008	
25,000	25,000	.00142	.00008			
26,000	26,000	.00150	.00008			
27,000	27,000	.00160	.00010			
28,000	28,000	.00168	.00008			
29,000	29,000	.00177	.00009	.00032	.00014	
30,000	30,000	.00188	.00011			
31,000	31,000	.00198	.00010			
32,000	32,000	.00208	.00010			
33,000	33,000	.00221	.00013			
34,000	34,000	.00237	.00016	.00067	.00035	
35,000	35,000	.00257	.00020			
36,000	36,000	.00271	.00014			
37,000	37,000	.00294	.00023			
38,000	38,000	.00318	.00024			
39,000	39,000	.00352	.00034	.00148	.00081	
40,000	40,000					Ultimate strength.
55,200	55,200					

Failed by triple flexure.
Specific gravity, 7.3195.
Hardness, 17.81.

No. 4085.

Marks, $\frac{12\,M\,R_2}{B\,T_2}\,T\,R_2$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

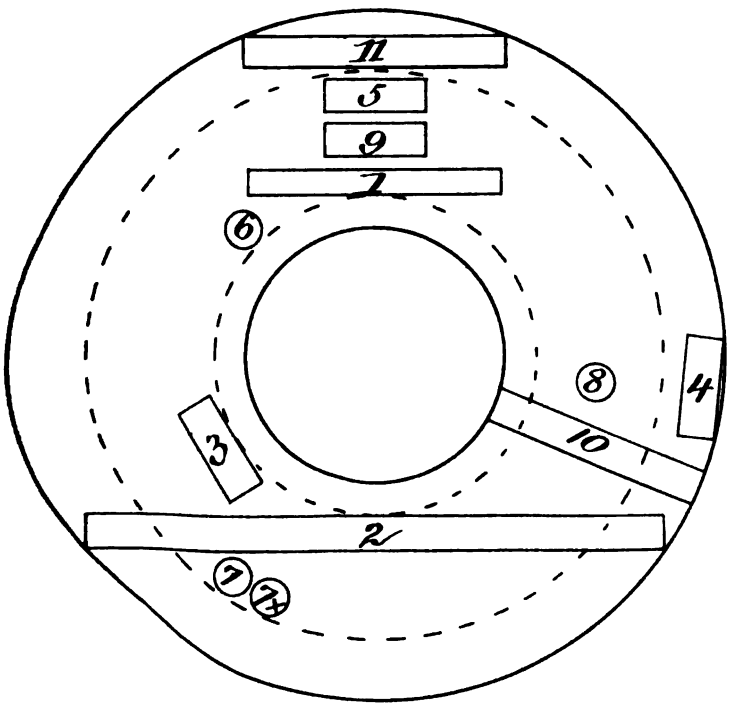
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Rema
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000110	.000055	.....	.....	
4,000	4,000	.000160	.000050	.....	.....	
5,000	5,000	.000215	.000055	.000005	.000005	
6,000	6,000	.000275	.000060	.....	.....	
7,000	7,000	.000340	.000065	.....	.....	
8,000	8,000	.000400	.000060	.....	.....	
9,000	9,000	.000460	.000060	.....	.....	
10,000	10,000	.000515	.000055	.000040	.000035	
11,000	11,000	.000590	.000075	.....	.....	
12,000	12,000	.000660	.000070	.000155	.000015	
13,000	13,000	.000745	.000085	.....	.....	
14,000	14,000	.000820	.000075	.000090	.000035	
15,000	15,000	.000910	.000090	.....	.....	
16,000	16,000	.001010	.000100	.000155	.000065	
17,000	17,000	.001110	.000100	.....	.....	
18,000	18,000	.001250	.000140	.000250	.000095	
19,000	19,000	.001385	.000135	.....	.....	
20,000	20,000	.001555	.000170	.000405	.000155	
21,000	21,000	.001745	.000190	.....	.....	
22,000	22,000	.001985	.000240	.000660	.000255	
23,000	23,000	.002275	.000290	.....	.....	
24,000	24,000	.002625	.000350	.001140	.000480	
25,000	25,000	.003105	.000480	.001515	.000375	
29,630	29,630	.....	.....	.....	.....	Tensile

Fractured 1¼″ from neck.
Appearance, uniform granular.
Specific gravity, 7.3128.
Hardness, 14.33.

12-inch B.L. Rifled Mortars.

Cast Iron Bodies Nos. 21, 23, 25.

Specimens from Breech discs.



H Ex 165 51 2

No. 854.

Marks, $^{12\,M\,R_2\,T\,R_2}_{B\,T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00003	.00003	.....	.....	
3,000	3,000	.00008	.00005	.....	.....	
4,000	4,000	.00013	.00005	.....	.....	
5,000	5,000	.00018	.00005	.00001	.00001	
6,000	6,000	.00024	.00006	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00035	.00005	.....	.....	
9,000	9,000	.00040	.00005	.....	.....	
10,000	10,000	.00046	.00006	.00001	0.	
11,000	11,000	.00051	.00005	.....	.....	
12,000	12,000	.00057	.00006	.....	.....	
13,000	13,000	.00062	.00005	.....	.....	
14,000	14,000	.00068	.00006	.....	.....	
15,000	15,000	.00073	.00005	.00004	.00003	
16,000	16,000	.00079	.00006	.....	.....	
17,000	17,000	.00087	.00008	.....	.....	
18,000	18,000	.00092	.00005	.....	.....	
19,000	19,000	.00101	.00009	.....	.....	
20,000	20,000	.00109	.00008	.00012	.00008	
21,000	21,000	.00116	.00007	.....	.....	
22,000	22,000	.00122	.00006	.....	.....	
23,000	23,000	.00130	.00008	.....	.....	
24,000	24,000	.00140	.00010	.....	.....	
25,000	25,000	.00150	.00010	.00027	.00015	
26,000	26,000	.00162	.00012	.....	.....	
27,000	27,000	.00176	.00014	.....	.....	
28,000	28,000	.00190	.00014	.....	.....	
29,000	29,000	.00206	.00016	.....	.....	
30,000	30,000	.00227	.00021	.00075	.00048	
31,000	31,000	.00246	.00019	.....	.....	
32,000	32,000	.00266	.00020	.....	.....	
33,000	33,000	.00290	.00024	.....	.....	
34,000	34,000	.00330	.00040	.....	.....	
35,000	35,000	.00372	.00042	.00102	.00117	
36,000	36,000	.00412	.00040	.....	.....	
37,000	37,000	.00448	.00036	.....	.....	
38,000	38,000	.00485	.00037	.....	.....	
39,000	39,000	.00537	.00052	.....	.....	
40,000	40,000	.00591	.00054	.00382	.00190	
50,400	50,400	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.
Specific gravity, 7.3183.
Hardness, 14.69.

No. 855.

Marks, $\frac{12\ M\ R_{21}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004			
3,000	3,000	.00008	.00004			
4,000	4,000	.00012	.00004			
5,000	5,000	.00016	.00004	0.		
6,000	6,000	.00022	.00006			
7,000	7,000	.00026	.00004			
8,000	8,000	.00032	.00006			
9,000	9,000	.00038	.00006			
10,000	10,000	.00044	.00006	0.		
11,000	11,000	.00048	.00004			
12,000	12,000	.00054	.00006			
13,000	13,000	.00060	.00006			
14,000	14,000	.00064	.00004			
15,000	15,000	.00072	.00008	.00006	.00006	
16,000	16,000	.00078	.00006			
17,000	17,000	.00084	.00006			
18,000	18,000	.00090	.00006			
19,000	19,000	.00098	.00008			
20,000	20,000	.00104	.00006	.00014	.00008	
21,000	21,000	.00112	.00008			
22,000	22,000	.00118	.00006			
23,000	23,000	.00126	.00008			
24,000	24,000	.00138	.00012			
25,000	25,000	.00146	.00008	.00030	.00016	
26,000	26,000	.00158	.00008			
27,000	27,000	.00170	.00012			
28,000	28,000	.00184	.00014			
29,000	29,000	.00198	.00014			
30,000	30,000	.00220	.00022	.00094	.00064	
31,000	31,000	.00244	.00024			
32,000	32,000	.00264	.00020			
33,000	33,000	.00294	.00030			
34,000	34,000	.00334	.00040			
35,000	35,000	.00380	.00046	.00202	.00108	
36,000	36,000	.00414	.00034			
37,000	37,000	.00458	.00044			
38,000	38,000	.00502	.00044			
39,000	39,000	.00556	.00054			
40,000	40,000	.00620	.00064	.00414	.00212	
60,980	60,980					Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 22.

No. 4124.

Marks, $^{12\ M\ R_{22}\ T\ R_1}_{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000105	.000050	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000205	.000050	.000005	.000005	
6,000	6,000	.000255	.000050	.....	.....	
7,000	7,000	.000305	.000050	.....	.....	
8,000	8,000	.000355	.000050	.....	.....	
9,000	9,000	.000410	.000055	.....	.....	
10,000	10,000	.000460	.000050	.000010	.000005	
11,000	11,000	.000515	.000055	.....	.....	
12,000	12,000	.000580	.000065	.000020	.000010	
13,000	13,000	.000640	.000060	.....	.....	
14,000	14,000	.000705	.000065	.000040	.000020	
15,000	15,000	.000780	.000075	.....	.....	
16,000	16,000	.000850	.000070	.000060	.000020	
17,000	17,000	.000915	.000065	.....	.....	
18,000	18,000	.001000	.000085	.000095	.000035	
19,000	19,000	.001090	.000090	.....	.....	
20,000	20,000	.001190	.000100	.000155	.000060	
21,000	21,000	.001290	.000100	.....	.....	
22,000	22,000	.001405	.000115	.000215	.000090	
23,000	23,000	.001520	.000115	.....	.....	
24,000	24,000	.001685	.000165	.000375	.000130	
25,000	25,000	.001875	.000190	.000490	.000115	
29,520	29,520	.....	.....	.....	.....	Tensile strength.

Fractured 1″ from neck.
Appearance, granular mottled.

TENACITY SPECIMENS.

General marks, 12 M R_{22} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4439	M T_3 I	1.129	1.00	32,040	32,040	7.3235	17.44
4440	M T_4 O	1.129	1.00	31,120	31,120	7.3278	16.73
4441	M T_5 M	1.129	1.00	31,530	31,530	7.3326	17.26
4442	M T_6 O	1.129	1.00	32,890	32,890	7.3279	15.59

No. 859.

Marks, $^{12}\,\mathrm{M}\,\mathrm{R}_{\mathrm{M}}^{\mathrm{R}}\,\mathrm{T}\,\mathrm{R}_{1}$
T_{1}
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00010	.00005			
4,000	4,000	.00015	.00005			
5,000	5,000	.00019	.00004	0.		
6,000	6,000	.00025	.00006			
7,000	7,000	.00030	.00005			
8,000	8,000	.00035	.00005			
9,000	9,000	.00040	.00005			
10,000	10,000	.00046	.00006	0.		
11,000	11,000	.00050	.00004			
12,000	12,000	.00056	.00006			
13,000	13,000	.00061	.00005			
14,000	14,000	.00066	.00005			
15,000	15,000	.00072	.00006	.00004	.00004	
16,000	16,000	.00080	.00008			
17,000	17,000	.00086	.00006			
18,000	18,000	.00091	.00005			
19,000	19,000	.00099	.00008			
20,000	20,000	.00103	.00004	.00009	.00005	
21,000	21,000	.00109	.00006			
22,000	22,000	.00116	.00007			
23,000	23,000	.00120	.00004			
24,000	24,000	.00128	.00008			
25,000	25,000	.00134	.00006	.00016	.00007	
26,000	26,000	.00140	.00006			
27,000	27,000	.00148	.00008			
28,000	28,000	.00156	.00008			
29,000	29,000	.00163	.00007			
30,000	30,000	.00171	.00008	.00030	.00014	
31,000	31,000	.00181	.00010			
32,000	32,000	.00191	.00010			
33,000	33,000	.00205	.00014			
34,000	34,000	.00218	.00013			
35,000	35,000	.00232	.00014	.00062	.00032	
36,000	36,000	.00249	.00017			
37,000	37,000	.00265	.00016			
38,000	38,000	.00285	.00020			
39,000	39,000	.00308	.00023			
40,000	40,000	.00339	.00031	.00138	.00076	
57,160	57,160					Ultimate strength.

Failed by triple flexure.

No. 4122.

Marks, $\frac{12\,M\,R_2\,T\,R_2}{B\,T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000105	.000050	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000205	.000050	0.	.....	
6,000	6,000	.000265	.000060	.....	.....	
7,000	7,000	.000325	.000060	.....	.....	
8,000	8,000	.000385	.000060	.....	.....	
9,000	9,000	.000440	.000055	.....	.....	
10,000	10,000	.000505	.000065	.000035	.000035	
11,000	11,000	.000580	.000075	.....	.....	
12,000	12,000	.000650	.000070	.000055	.000020	
13,000	13,000	.000730	.000080	.....	.....	
14,000	14,000	.000790	.000060	.000090	.000035	
15,000	15,000	.000880	.000090	.....	.....	
16,000	16,000	.000975	.000095	.000130	.000040	
17,000	17,000	.001070	.000095	.....	.....	
18,000	18,000	.001185	.000115	.000210	.000080	
19,000	19,000	.001300	.000115	.....	.....	
20,000	20,000	.001450	.000150	.000350	.000140	
21,000	21,000	.001640	.000190	.....	.....	
22,000	22,000	.001790	.000150	.000550	.000200	
23,000	23,000	.002055	.000265	.....	.....	
24,000	24,000	.002340	.000285	.000910	.000360	
25,000	25,000	.002740	.000400	.001215	.000305	
26,520	26,520	.....	.....	.....	.....	Tensile strength.

Fractured 3¼″ from neck.
Appearance, uniform granular.
Specific gravity, 7.3253.
Hardness, 15.75.

No. 858.

Marks, $^{12}\,\mathrm{M}\,\mathrm{R}\,\frac{\mathrm{T}\,\mathrm{R}_2}{\mathrm{B}\,\mathrm{T}_1}$,
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00021	.00006	0.	.....	
6,000	6,000	.00028	.00007	.....	.....	
7,000	7,000	.00033	.00005	.....	.....	
8,000	8,000	.00038	.00005	.....	.....	
9,000	9,000	.00043	.00005	.....	.....	
10,000	10,000	.00049	.00006	.00004	.00004	
11,000	11,000	.00055	.00006	.....	.....	
12,000	12,000	.00061	.00006	.....	.....	
13,000	13,000	.00066	.00005	.....	.....	
14,000	14,000	.00072	.00006	.....	.....	
15,000	15,000	.00078	.00006	.00010	.00006	
16,000	16,000	.00083	.00005	.....	.....	
17,000	17,000	.00092	.00009	.....	.....	
18,000	18,000	.00098	.00006	.....	.....	
19,000	19,000	.00103	.00005	.....	.....	
20,000	20,000	.00110	.00007	.00014	.00004	
21,000	21,000	.00117	.00007	.....	.....	
22,000	22,000	.00124	.00007	.....	.....	
23,000	23,000	.00132	.00008	.....	.....	
24,000	24,000	.00140	.00008	.....	.....	
25,000	25,000	.00151	.00011	.00029	.00015	
26,000	26,000	.00162	.00011	.....	.....	
27,000	27,000	.00172	.00010	.....	.....	
28,000	28,000	.00186	.00014	.....	.....	
29,000	29,000	.00200	.00014	.....	.....	
30,000	30,000	.00220	.00020	.00072	.00043	
31,000	31,000	.00240	.00020	.....	.....	
32,000	32,000	.00257	.00017	.....	.....	
33,000	33,000	.00282	.00025	.....	.....	
34,000	34,000	.00322	.00040	.....	.....	
35,000	35,000	.00352	.00030	.00177	.00105	
36,000	36,000	.00402	.00050	.....	.....	
37,000	37,000	.00432	.00029	.....	.....	
38,000	38,000	.00472	.00041	.....	.....	
39,000	39,000	.00517	.00045	.....	.....	
40,000	40,000	.00580	.00063	.00371	.00194	
52,250	52,250	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 857.

arks, $\frac{12\ M\ R_{22}\ T\ R_2}{B\ R_{10}}$
ngth, 10″.
ameter, 1″.129.
tional area, 1 square inch.
ged length, 5″.

pplied loads. L. Per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	0.	0.	0.	0.	Initial load.
1,000	.00004	.00004			
2,000	.00010	.00006			
3,000	.00014	.00004			
4,000	.00020	.00006	0.		
5,000	.00024	.00004			
6,000	.00028	.00004			
7,000	.00034	.00006			
8,000	.00038	.00004			
9,000	.00046	.00008	.00002	.00002	
10,000	.00050	.00004			
11,000	.00054	.00004			
12,000	.00062	.00008			
13,000	.00068	.00006			
14,000	.00074	.00006	.00008	.00006	
15,000	.00080	.00006			
16,000	.00086	.00006			
17,000	.00094	.00008			
18,000	.00100	.00006			
19,000	.00106	.00006	.00014	.00006	
20,000	.00114	.00008			
21,000	.00118	.00004			
22,000	.08128	.00010			
23,000	.00138	.00010			
24,000	.00148	.00010	.00026	.00012	
25,000	.00158	.00010			
26,000	.00168	.00010			
27,000	.00182	.00014			
28,000	.00198	.00016			
29,000	.00220	.00022	.00072	.00046	
30,000	.00234	.00014			
31,000	.00258	.00024			
32,000	.00284	.00026			
33,000	.00318	.00034			
34,000	.00360	.00042	.00184	.00112	
35,000	.00394	.00034			
36,000	.00448	.00054			
37,000	.00480	.00032			
38,000	.00562	.00052			
39,000	.00584	.00052	.00376	.00192	
40,000					Ultimate strength.
62,540					

d by triple flexure.

CAST-IRON BODY, No. 23.

No. 4152.

Marks, $^{12\ M\ R_{23}\ T\ R_1}_{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000360	.000055	.....	.....	
9,000	9,000	.000420	.000060	.....	.....	
10,000	10,000	.000475	.000055	.000020	.000020	
11,000	11,000	.000525	.000050	.....	.....	
12,000	12,000	.000600	.000075	.000050	.000030	
13,000	13,000	.000660	.000060	.....	.....	
14,000	14,000	.000730	.000070	.000055	.000005	
15,000	15,000	.000800	.000070	.....	.....	
16,000	16,000	.000865	.000065	.000085	.000030	
17,000	17,000	.000935	.000070	.....	.....	
18,000	18,000	.001020	.000085	.000120	.000035	
19,000	19,000	.001115	.000095	.....	.....	
20,000	20,000	.001215	.000100	.000175	.000055	
21,000	21,000	.001305	.000090	.....	.....	
22,000	22,000	.001420	.000115	.000260	.000085	
23,000	23,000	.001530	.000110	.....	.....	
24,000	24,000	.001665	.000135	.000370	.000110	
25,000	25,000	.001845	.000180	.000470	.000100	
30,480	30,480	.....	.....	.....	.....	Tensile strength.

Fractured 2¼″ from neck.
Appearance, granular mottled.

TENACITY SPECIMENS.

General marks, 12 M R_{23} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4450	M T_3 I	1.129	1.00	33,470	33,470	7.3137	16.82
4451	M T_4 O	1.129	1.00	29,210	29,210	7.3153	16.56
4452	M T_5 M	1.129	1.00	32,640	32,640	7.3288	17.62
4453	M T_6 O	1.129	1.00	32,390	32,390	7.3101	16.23

No. 4126.

Marks, $\frac{^{12}\mathrm{M}\,\mathrm{R}_2\,\mathrm{T}\,\mathrm{R}_2}{\mathrm{B}\,\mathrm{T}_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000110	.000055	.....	.....	
4,000	4,000	.000160	.000050	.....	.....	
5,000	5,000	.000215	.000055	0.	.....	
6,000	6,000	.000265	.000050	.....	.....	
7,000	7,000	.000330	.000065	.....	.....	
8,000	8,000	.000390	.000060	.....	.....	
9,000	9,000	.000455	.000065	.....	.....	
10,000	10,000	.000515	.000060	.000020	.000320	
11,000	11,000	.000580	.000065	.....	.....	
12,000	12,000	.000660	.000080	.000040	.000020	
13,000	13,000	.000730	.000070	.....	.....	
14,000	14,000	.000810	.000080	.000090	.000050	
15,000	15,000	.000890	.000080	.....	.....	
16,000	16,000	.001000	.000110	.000135	.000045	
17,000	17,000	.001100	.000100	.....	.....	
18,000	18,000	.001215	.000115	.000205	.000070	
19,000	19,000	.001350	.000135	.....	.....	
20,000	20,000	.001490	.000140	.000340	.000135	
21,000	21,000	.001675	.000185	.....	.....	
22,000	22,000	.001875	.000200	.000570	.000230	
23,000	23,000	.002140	.000265	.....	.....	
24,000	24,000	.002450	.000310	.000950	.000380	
25,000	25,000	.002925	.000475	.001330	.000380	
26,140	26,140	.....	.....	.....	.....	Tensile strength.

Appearance, uniform granular.
Fractured 3″.75 from neck.

No. 4127.

Marks, $^{12\ M\ R_{23}\ T\ R_3}_{B\ T_{11}}$
Length of stem, 9¼″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000060	.000060	.....	.....	
3,000	3,000	.000120	.000060	.....	.....	
4,000	4,000	.000180	.000060	.....	.....	
5,000	5,000	.000240	.000060	0.	.....	
6,000	6,000	.000280	.000040	.....	.....	
7,000	7,000	.000320	.000040	.....	.....	
8,000	8,000	.000380	.000060	.....	.....	
9,000	9,000	.000440	.000060	.....	.....	
10,000	10,000	.000500	.000060	.000040	.000040	
11,000	11,000	.000580	.000080	.....	.....	
12,000	12,000	.000680	.000100	.000060	.000020	
13,000	13,000	.000760	.000080	.....	.....	
14,000	14,000	.000840	.000080	.000100	.000040	
15,000	15,000	.000900	.000060	.....	.....	
16,000	16,000	.001000	.000100	.000160	.000060	
17,000	17,000	.001100	.000100	.....	.....	
18,000	18,000	.001200	.000100	.000200	.000040	
19,000	19,000	.001300	.000100	.....	.....	
20,000	20,000	.001480	.000160	.000340	.000140	
21,000	21,000	.001640	.000160	.....	.....	
22,000	22,000	.001780	.000140	.000540	.000200	
23,000	23,000	.002040	.000260	.....	.....	
24,000	24,000	.002300	.000260	.000880	.000340	
25,000	25,000	.002640	.000340	.001160	.000280	
30,710	30,710	.....	.....	.....	.....	Tensile strength.

Fractured 4.″25 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{23} T R_3.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4443	B T_2 I	1.129	1.00	29,970	29,970	.....	.....
4444	B T_4 O	1.129	1.00	33,700	33,700	7.3074	14.90
4445	B T_6 M	1.129	1.00	31,560	31,560	.....	.....
4446	B L_6 I	1.129	1.00	29,810	29,810	7.3121	14.90
4447	B L_7 O	1.129	1.00	33,050	33,050	7.3127	14.76
4448	B L_8 M	1.129	1.00	32,020	32,020	7.3136	15.05
4449	B T_9 M	1.129	1.00	30,040	30,040	.....	.....

No. 860.

Marks, $^{12\ M\ R_{23}\ T\ R_2}_{1;\ T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00016	.00005			
5,000	5,000	.00021	.00005	0.		
6,000	6,000	.00026	.00005			
7,000	7,000	.00032	.00006			
8,000	8,000	.00037	.00005			
9,000	9,000	.00042	.00005			
10,000	10,000	.00050	.00008	.00003	.00003	
11,000	11,000	.00056	.00006			
12,000	12,000	.00061	.00005			
13,000	13,000	.00068	.00007			
14,000	14,000	.00075	.00007			
15,000	15,000	.00081	.00006	.00009	.00006	
16,000	16,000	.00087	.00006			
17,000	17,000	.00092	.00005			
18,000	18,000	.00099	.00007			
19,000	19,000	.00107	.00008			
20,000	20,000	.00116	.00009	.00018	.00009	
21,000	21,000	.00122	.00006			
22,000	22,000	.00131	.00009			
23,000	23,000	.00140	.00009			
24,000	24,000	.00150	.00010			
25,000	25,000	.00161	.00011	.00034	.00016	
26,000	26,000	.00171	.00010			
27,000	27,000	.00181	.00010			
28,000	28,000	.00196	.00017			
29,000	29,000	.00212	.00016			
30,000	30,000	.00229	.00017	.00077	.00043	
31,000	31,000	.00247	.00018			
32,000	32,000	.00267	.00020			
33,000	33,000	.00292	.00025			
34,000	34,000	.00324	.00032			
35,000	35,000	.00368	.00044	.00178	.00101	
36,000	36,000	.00392	.00024			
37,000	37,000	.00428	.00036			
38,000	38,000	.00474	.00046			
39,000	39,000	.00527	.00053			
40,000	40,000	.00578	.00051	.00363	.00185	
52,300	52,300					Ultimate strength.

Failed by triple flexure.

No. 861.

Marks, $\frac{12\ M\ R_{22}\ T\ R_2}{B\ E_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00010	.00004			
4,000	4,000	.00014	.00004			
5,000	5,000	.00018	.00004	0.		
6,000	6,000	.00024	.00006			
7,000	7,000	.00030	.00006			
8,000	8,000	.00036	.00006			
9,000	9,000	.00040	.00004			
10,000	10,000	.00046	.00006	.00004	.00004	
11,000	11,000	.00052	.00006			
12,000	12,000	.00058	.00006			
13,000	13,000	.00064	.00006			
14,000	14,000	.00070	.00006			
15,000	15,000	.00078	.00008	.00010	.00006	
16,000	16,000	.00082	.00004			
17,000	17,000	.00088	.00006			
18,000	18,000	.00094	.00006			
19,000	19,000	.00102	.00008			
20,000	20,000	.00110	.00008	.00016	.00006	
21,000	21,000	.00118	.00008			
22,000	22,000	.00124	.00006			
23,000	23,000	.00132	.00008			
24,000	24,000	.00140	.00008			
25,000	25,000	.00150	.00010	.00030	.00014	
26,000	26,000	.00160	.00010			
27,000	27,000	.00170	.00010			
28,000	28,000	.00184	.00014			
29,000	29,000	.00196	.00012			
30,000	30,000	.00212	.00016	.00064	.00034	
31,000	31,000	.00232	.00020			
32,000	32,000	.00252	.00020			
33,000	33,000	.00274	.00022			
34,000	34,000	.00302	.00028			
35,000	35,000	.00340	.00038	.00164	.00100	
36,000	36,000	.00374	.00034			
37,000	37,000	.00404	.00030			
38,000	38,000	.00448	.00044			
39,000	39,000	.00492	.00044			
40,000	40,000	.00554	.00062	.00352	.00188	
61,460	61,460	----------	----------	----------	----------	Ultimate strength.

Failed by triple flexure.

H. Ex. 165——20

CAST-IRON BODY, No. 24.

No. 4160.

Marks, $\frac{12\ M\ R_{24}\ T\ R_1}{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055	.....	.....	
3,000	3,000	.000105	.000050	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000205	.000050	.000005	.000005	
6,000	6,000	.000255	.000050	.....	.....	
7,000	7,000	.000305	.000050	.....	.....	
8,000	8,000	.000355	.000050	.....	.....	
9,000	9,000	.000410	.000055	.....	.....	
10,000	10,000	.000470	.000060	.000025	.000025	
11,000	11,000	.000525	.000055	.....	.....	
12,000	12,000	.000585	.000060	.000035	.000010	
13,000	13,000	.000650	.000065	.....	.....	
14,000	14,000	.000710	.000060	.000050	.000015	
15,000	15,000	.000775	.000065	.....	.....	
16,000	16,000	.000855	.000080	.000085	.000035	
17,000	17,000	.000915	.000060	.....	.....	
18,000	18,000	.001005	.000090	.000105	.000020	
19,000	19,000	.001090	.000085	.....	.....	
20,000	20,000	.001170	.000080	.000160	.000055	
21,000	21,000	.001265	.000095	.....	.....	
22,000	22,000	.001385	.000120	.000240	.000080	
23,000	23,000	.001505	.000120	.....	.....	
24,000	24,000	.001635	.000130	.000360	.000120	
25,000	25,000	.001800	.000165	.000450	.000090	
29,580	29,580	.....	.....	.....	.....	Tensile strength.

Fractured 11″ from neck.
Appearance, granular, with coarse, dark-colored spangles.

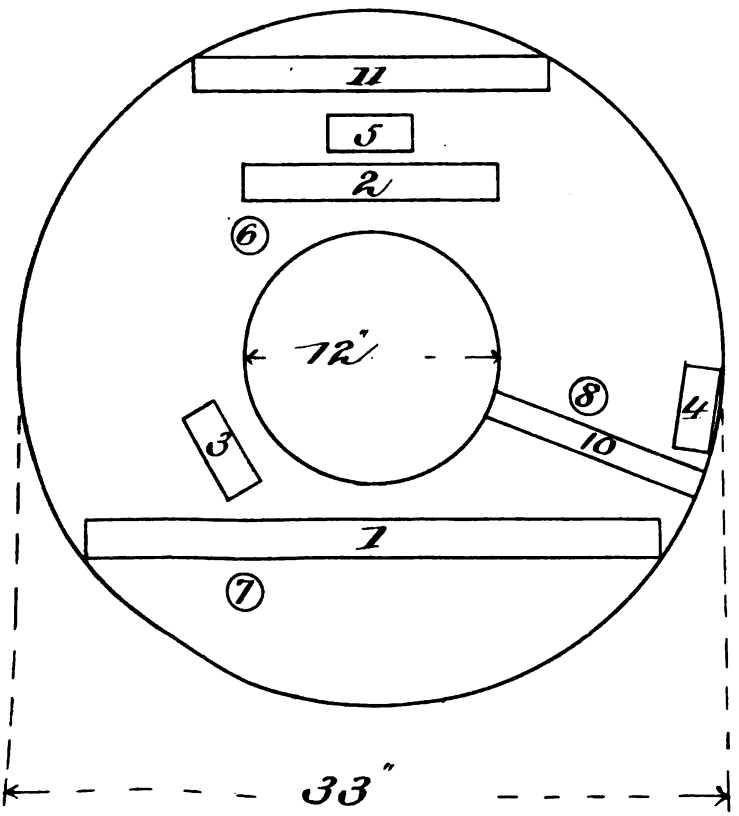
TENACITY SPECIMENS.

General marks, 12 M R_{24} T R_1.

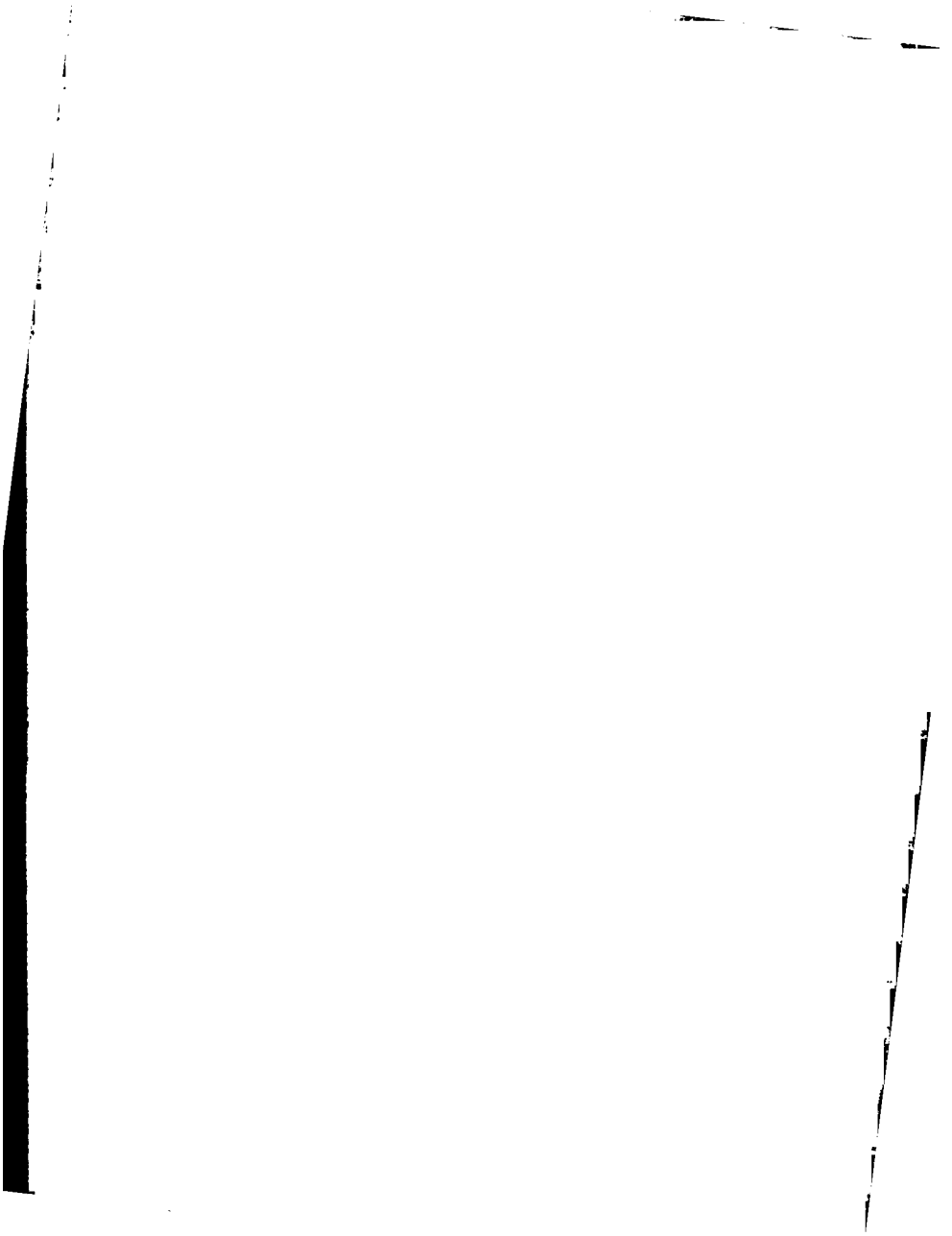
No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4454	M T_2 I	1.129	1.00	32,980	32,980	7.3230	19.06
4455	M T_2 O	1.129	1.00	32,960	32,960	7.3184	17.62
4456	M T_2 M	1.129	1.00	32,210	32,210	7.3321	18.28
4457	M T_2 O	1.129	1.00	34,270	34,270	7.3203	16.99

12-inch B.L Rifled Mortars

Cast Iron Bodies Nos. 24. 26, 27. 28. 29. 30 & 31.
Breech Discs.



H Ex. 165 51 2



No. 863.

rks, $\frac{12\ M\ R_1\ T\ R_1}{M\ T_1}$
ngth, 12″.
ameter, 1″.129.
ctional area, 1 square inch.
uged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
otal.	Per square inch.					
unds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
1, 000	1, 000	0.	0.	0.	0.	
2, 000	2, 000	.00004	.00004	.....	.....	
3, 000	3, 000	.00009	.00005	.....	.....	
4, 000	4, 000	.00014	.00005	.....	.....	
5, 000	5, 000	.00019	.00005	0.	.....	
6, 000	6, 000	.00024	.00005	.....	.....	
7, 000	7, 000	.00029	.00005	.....	.....	
8, 000	8, 000	.00033	.00004	.....	.....	
9, 000	9, 000	.00038	.00005	.....	.....	
10, 000	10, 000	.00043	.00005	.00001	.00001	
11, 000	11, 000	.00048	.00005	.....	.....	
12, 000	12, 000	.00052	.00004	.....	.....	
13, 000	13, 000	.00059	.00007	.....	.....	
14, 000	14, 000	.00064	.00005	.....	.....	
15, 000	15, 000	.00069	.00005	.00005	.00004	
16, 000	16, 000	.00075	.00006	.....	.....	
17, 000	17, 000	.00082	.00007	.....	.....	
18, 000	18, 000	.00087	.00005	.....	.....	
19, 000	19, 000	.00092	.00005	.....	.....	
20, 000	20, 000	.00098	.00006	.00008	.00003	
21, 000	21, 000	.00103	.00005	.....	.....	
22, 000	22, 000	.00109	.00006	.....	.....	
23, 000	23, 000	.00116	.00007	.....	.....	
24, 000	24, 000	.00122	.00006	.....	.....	
25, 000	25, 000	.00128	.00006	.00014	.00006	
26, 000	26, 000	.00136	.00008	.....	.....	
27, 000	27, 000	.00142	.00006	.....	.....	
28, 000	28, 000	.00149	.00007	.....	.....	
29, 000	29, 000	.00157	.00008	.....	.....	
30, 000	30, 000	.00163	.00006	.00023	.00009	
31, 000	31, 000	.00171	.00008	.....	.....	
32, 000	32, 000	.00180	.00009	.....	.....	
33, 000	33, 000	.00191	.00011	.....	.....	
34, 000	34, 000	.00201	.00010	.....	.....	
35, 000	35, 000	.00212	.00011	.00043	.00020	
36, 000	36, 000	.00224	.00012	.....	.....	
37, 000	37, 000	.00235	.00011	.....	.....	
38, 000	38, 000	.00248	.00013	.....	.....	
39, 000	39, 000	.00264	.00016	.....	.....	
40, 000	40, 000	.00282	.00018	.00088	.00045	
58, 560	58, 560	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4161.

Marks, $^{12\ M\ R_2}_{B\ T_1}\ T\ R_2$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000105	.000055	.....	.....	
4,000	4,000	.000155	.000050	.....	.....	
5,000	5,000	.000210	.000055	0.	.....	
6,000	6,000	.000260	.000050	.....	.....	
7,000	7,000	.000320	.000060	.....	.....	
8,000	8,000	.000385	.000065	.....	.....	
9,000	9,000	.000450	.000065	.....	.....	
10,000	10,000	.000510	.000060	.000040	.000040	
11,000	11,000	.000575	.000065	.....	.....	
12,000	12,000	.000645	.000070	.000050	.000010	
13,000	13,000	.000720	.000075	.....	.....	
14,000	14,000	.000800	.000080	.000075	.000025	
15,000	15,000	.000885	.000085	.....	.....	
16,000	16,000	.000965	.000080	.000135	.000060	
17,000	17,000	.001060	.000095	.....	.....	
18,000	18,000	.001185	.000125	.000195	.000060	
19,000	19,000	.001290	.000105	.....	.....	
20,000	20,000	.001410	.000120	.000295	.000100	
21,000	21,000	.001585	.000175	.....	.....	
22,000	22,000	.001755	.000170	.000475	.000180	
23,000	23,000	.001950	.000195	.....	.....	
24,000	24,000	.002200	.000250	.000760	.000285	
25,000	25,000	.002505	.000305	.000995	.000235	
29,030	29,030	.....	.....	.....	.....	Tensile strength.

Fractured 2½″ from neck.
Appearance, uniform granular.

No. 4162.

Marks, $\frac{12\ M\ R_{24}\ T\ R_2}{B\ T_{11}}$
Length of stem, 15″.75.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00016	.00005			
5,000	5,000	.00022	.00006	0.		
6,000	6,000	.00028	.00006			
7,000	7,000	.00033	.00005			
8,000	8,000	.00039	.00006			
9,000	9,000	.00046	.00007			
10,000	10,000	.00052	.00006	.00002	.00002	
11,000	11,000	.00058	.00006			
12,000	12,000	.00065	.00007	.00004	.00002	
13,000	13,000	.00072	.00007			
14,000	14,000	.00082	.00010	.00008	.00004	
15,000	15,000	.00089	.00007			
16,000	16,000	.00100	.00011	.00012	.00004	
17,000	17,000	.00110	.00010			
18,000	18,000	.00122	.00012	.00021	.00009	
19,000	19,000	.00136	.00014			
20,000	20,000	.00151	.00015	.00037	.00016	
21,000	21,000	.00169	.00018			
22,000	22,000	.00190	.00021	.00059	.00022	
23,000	23,000	.00218	.00028			
24,000	24,000	.00248	.00030	.00100	.00041	
25,000	25,000	.00288	.00040	.00130	.00030	
29,990	29,990					Tensile strength.

Fractured 7″ from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{24} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4458	B T_3 I	1.129	1.00	30,910	30,910		
4459	B T_4 O	1.129	1.00	32,990	32,990	7.3153	15.51
4460	B T_5 M	1.129	1.00	32,450	32,450		
4461	B L_1 I	1.129	1.00	33,920	33,920	7.3160	15.51
4462	B L_7 O	1.129	1.00	31,030	31,030	7.3148	15.28
4463	B L_8 M	1.129	1.00	32,650	32,650	7.3183	15.43

CAST-IRON BODY, No. 25.

No. 4165.

Marks, $\frac{12\,M\,R_{25}\,T\,R_1}{M\,T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000300	.000050	.....	.....	
8,000	8,000	.000355	.000055	.....	.....	
9,000	9,000	.000410	.000055	.....	.....	
10,000	10,000	.000480	.000070	.000015	.000015	
11,000	11,000	.000535	.000055	.....	.....	
12,000	12,000	.000605	.000070	.000020	.000005	
13,000	13,000	.000660	.000055	.....	.....	
14,000	14,000	.000735	.000075	.000065	.000045	
15,000	15,000	.000810	.000075	.....	.....	
16,000	16,000	.000900	.000090	.000110	.000055	
17,000	17,000	.000990	.000090	.....	.....	
18,000	18,000	.001100	.000110	.000190	.000080	
19,000	19,000	.001205	.000105	.....	.....	
20,000	20,000	.001345	.000140	.000305	.000115	
21,000	21,000	.001500	.000155	.....	.....	
22,000	22,000	.001680	.000180	.000560	.000195	
23,000	23,000	.001935	.000255	.....	.....	
24,000	24,000	.002210	.000275	.000875	.000375	
25,000	25,000	.002625	.000415	.001200	.000325	
28,480	28,480	.....	.....	.....	.....	Tensile strength.

Fractured 2″ from neck.
Appearance, granular mottled.

TENACITY SPECIMENS.

General marks, 12 M R_{25} T R_1

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hard
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4470	M T_2 I	1.129	1.00	32,590	32,590	7.3094	1
4471	M T_4 O	1.129	1.00	30,740	30,740	7.3072	1
4472	M T_2 M	1.129	1.00	29,930	29,930	7.3093	1
4473	M T_2 O	1.129	1.00	33,470	33,470	7.3003	1

No. 869.

Marks, $^{12\ M\ R_{28}\ T\ B_1}_{M\ T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	0.	.....	
6,000	6,000	.00025	.00005	.....	.....	
7,000	7,000	.00030	.00005	.....	.....	
8,000	8,000	.00034	.00004	.....	.....	
9,000	9,000	.00039	.00005	.....	.....	
10,000	10,000	.00044	.00005	.00002	.00002	
11,000	11,000	.00049	.00005	.....	.....	
12,000	12,000	.00054	.00005	.....	.....	
13,000	13,000	.00059	.00005	.....	.....	
14,000	14,000	.00065	.00006	.....	.....	
15,000	15,000	.00070	.00005	.00005	.00003	
16,000	16,000	.00075	.00005	.....	.....	
17,000	17,000	.00080	.00005	.....	.....	
18,000	18,000	.00088	.00007	.....	.....	
19,000	19,000	.00095	.00007	.....	.....	
20,000	20,000	.00100	.00005	.00012	.00007	
21,000	21,000	.00105	.00005	.....	.....	
22,000	22,000	.00112	.00007	.....	.....	
23,000	23,000	.00120	.00008	.....	.....	
24,000	24,000	.00128	.00008	.....	.....	
25,000	25,000	.00136	.00008	.00022	.00010	
26,000	26,000	.00145	.00009	.....	.....	
27,000	27,000	.00157	.00012	.....	.....	
28,000	28,000	.00168	.00011	.....	.....	
29,000	29,000	.00179	.00011	.....	.....	
30,000	30,000	.00196	.00017	.00059	.00037	
31,000	31,000	.00213	.00017	.....	.....	
32,000	32,000	.00231	.00018	.....	.....	
33,000	33,000	.00251	.00020	.....	.....	
34,000	34,000	.00279	.00027	.....	.....	
35,000	35,000	.00321	.00042	.00155	.00096	
36,000	36,000	.00355	.00034	.....	.....	
37,000	37,000	.00392	.00037	.....	.....	
38,000	38,000	.00437	.00045	.....	.....	
39,000	39,000	.00485	.00048	.....	.....	
40,000	40,000	.00538	.00053	.00345	.00190	
51,200	51,200	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4163.

Marks, $^{12\ M\ R_{25}\ T\ R_2}_{B\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000360	.000055	.....	.....	
9,000	9,000	.000420	.000060	.....	.....	
10,000	10,000	.000485	.000065	.000015	.000015	
11,000	11,000	.000540	.000055	.....	.....	
12,000	12,000	.000605	.000065	.000035	.000020	
13,000	13,000	.000665	.000060	.....	.....	
14,000	14,000	.000735	.000070	.000055	.000020	
15,000	15,000	.000805	.000070	.....	.....	
16,000	16,000	.000890	.000085	.000090	.000035	
17,000	17,000	.000960	.000070	.....	.....	
18,000	18,000	.001060	.000100	.000145	.000055	
19,000	19,000	.001155	.000095	.....	.....	
20,000	20,000	.001260	.000105	.000220	.000075	
21,000	21,000	.001395	.000135	.....	.....	
22,000	22,000	.001525	.000130	.000350	.000130	
23,000	23,000	.001690	.000165	.....	.....	
24,000	24,000	.002390	.000700	.000560	.000210	
25,000	25,000	.002640	.000250	.000735	.000175	
29,620	29,620	.....	.....	.....	.....	Tensile strength

Fractured 5½″ from neck.
Appearance, uniform granular.

No. 4164.

Marks, $^{12\,M\,R_{25}\,T\,R_2}_{B\,T_{11}}$
Length of stem, 11″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	0.	.....	
6,000	6,000	.00025	.00005	.....	.....	
7,000	7,000	.00031	.00006	.....	.....	
8,000	8,000	.00037	.00006	.....	.....	
9,000	9,000	.00043	.00006	.....	.....	
10,000	10,000	.00049	.00006	0.	.....	
11,000	11,000	.00055	.00006	.....	.....	
12,000	12,000	.00061	.00006	.00002	.00002	
13,000	13,000	.00068	.00007	.....	.....	
14,000	14,000	.00076	.00008	.00006	.00004	
15,000	15,000	.00083	.00007	.....	.....	
16,000	16,000	.00092	.00009	.00011	.00005	
17,000	17,000	.00101	.00009	.....	.....	
18,000	18,000	.00111	.00010	.00017	.00006	
19,000	19,000	.00121	.00010	.....	.....	
20,000	20,000	.00132	.00011	.00027	.00010	
21,000	21,000	.00147	.00015	.....	.....	
22,000	22,000	.00165	.00018	.00042	.00015	
23,000	23,000	.00184	.00019	.....	.....	
24,000	24,000	.00206	.00022	.00068	.00026	
25,000	25,000	.00238	.00032	.00092	.00024	
32,410	32,410	.....	.....	.....	.....	Tensile strength.

Fractured 1″ from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{25} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4164	B T_{11} I	1.129	1.00	33,720	33,720	.....	.....
4165	B T_{11} O	1.129	1.00	33,560	33,560	7.2991	15.28
4166	B T_{11} M	1.129	1.00	34,130	34,130	.....	.....
4167	B L_9 I	1.129	1.00	33,890	33,890	7.3073	16.23
4168	B L_9 O	1.129	1.00	35,830	35,830	7.3104	16.23
4169	B L_9 M	1.129	1.00	37,600	37,600	7.3158	15.75

No. 866.

Marks, $\frac{12\ M\ R_2\ T\ B_2}{B\ T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remark
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	.00001	.00001	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00032	.00006	.....	.....	
8,000	8,000	.00037	.00005	.....	.....	
9,000	9,000	.00042	.00005	.....	.....	
10,000	10,000	.00047	.00005	.00003	.00002	
11,000	11,000	.00052	.00005	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00063	.00005	.....	.....	
14,000	14,000	.00068	.00005	.....	.....	
15,000	15,000	.00074	.00006	.00008	.00005	
16,000	16,000	.00081	.00007	.....	.....	
17,000	17,000	.00086	.00005	.....	.....	
18,000	18,000	.00092	.00006	.....	.....	
19,000	19,000	.00098	.00006	.....	.....	
20,000	20,000	.00104	.00006	.00012	.00004	
21,000	21,000	.00112	.00008	.....	.....	
22,000	22,000	.00117	.00005	.....	.....	
23,000	23,000	.00125	.00008	.....	.....	
24,000	24,000	.00133	.00008	.....	.....	
25,000	25,000	.00142	.00009	.00023	.00011	
26,000	26,000	.00152	.00010	.....	.....	
27,000	27,000	.00160	.00008	.....	.....	
28,000	28,000	.00170	.00010	.....	.....	
29,000	29,000	.00182	.00012	.....	.....	
30,000	30,000	.00194	.00012	.00053	.00029	
31,000	31,000	.00212	.00018	.....	.....	
32,000	32,000	.00224	.00012	.....	.....	
33,000	33,000	.00244	.00020	.....	.....	
34,000	34,000	.00266	.00022	.....	.....	
35,000	35,000	.00296	.00030	.00128	.00076	
36,000	36,000	.00323	.00027	.....	.....	
37,000	37,000	.00348	.00025	.....	.....	
38,000	38,000	.00385	.00037	.....	.....	
39,000	39,000	.00428	.00043	.....	.....	
40,000	40,000	.00468	.00040	.00270	.00142	
52,150	52,150	.....	.....	.....	.....	Ultimate stren

Failed by triple flexure.

No. 868.

Marks, $\frac{12\,M\,R_2\,T\,R_2}{B\,R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00020	.00006	.00002	.00002	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00028	.00004	.....	.....	
8,000	8,000	.00034	.00006	.....	.....	
9,900	9,000	.00038	.00004	.....	.....	
10,000	10,000	.00044	.00006	.00004	.00002	
11,000	11,000	.00048	.00004	.....	.....	
12,000	12,000	.00054	.00006	.....	.....	
13,000	13,000	.00058	.00004	.....	.....	
14,000	14,000	.00064	.00006	.....	.....	
15,000	15,000	.00070	.00006	.00006	.00002	
16,000	16,000	.00076	.00006	.....	.....	
17,000	17,000	.00082	.00006	.....	.....	
18,000	18,000	.00088	.00006	.....	.....	
19,000	19,000	.00094	.00006	.....	.....	
20,000	20,000	.00100	.00006	.00012	.00006	
21,000	21,000	.00104	.00004	.....	.....	
22,000	22,000	.00110	.00006	.....	.....	
23,000	23,000	.00118	.00008	.....	.....	
24,000	24,000	.00124	.00006	.....	.....	
25,000	25,000	.00132	.00008	.00022	.00010	
26,000	26,000	.00142	.00010	.....	.....	
27,000	27,000	.00150	.00008	.....	.....	
28,000	28,000	.00160	.00010	.....	.....	
29,000	29,000	.00174	.00014	.....	.....	
30,000	30,000	.00188	.00014	.00048	.00026	
31,000	31,000	.00204	.00016	.....	.....	
32,000	32,000	.00218	.00014	.....	.....	
33,000	33,000	.00234	.00016	.....	.....	
34,000	34,000	.00254	.00020	.....	.....	
35,000	35,000	.00388	.00034	.00124	.00076	
36,000	36,000	.00314	.00026	.....	.....	
37,000	37,000	.00330	.00016	.....	.....	
38,000	38,000	.00376	.00046	.....	.....	
39,000	39,000	.00418	.00042	.....	.....	
40,000	40,000	.00454	.00036	.00264	.00140	
60,650	60,650	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 26.

No. 4296.

Marks, $\frac{12\,M\,R_{26}\,T\,R_1}{M\,T_2}$
Length of stem, 23″.
Diameter, 1″.126.
Sectional area, .99 square inch.
Gauged length, 20″.

Applied load.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
990	1,000	0.	0.	0.	0.	Initial load.
1,980	2,000	.000050	.000050	.....	.....	
2,970	3,000	.000105	.000055	.....	.....	
3,960	4,000	.000155	.000050	.....	.....	
4,950	5,000	.000205	.000050	.000005	.000005	
5,940	6,000	.000260	.000055	.....	.....	
6,930	7,000	.000320	.000060	.....	.....	
7,920	8,000	.000380	.000060	.....	.....	
8,910	9,000	.000440	.000060	.....	.....	
9,900	10,000	.000505	.000065	.000045	.000040	
10,890	11,000	.000570	.000065	.....	.....	
11,880	12,000	.000645	.000075	.000075	.000030	
12,870	13,000	.000715	.000070	.....	.....	
13,860	14,000	.000805	.000090	.000115	.000040	
14,850	15,000	.000895	.000090	.....	.....	
15,840	16,000	.000995	.000100	.000190	.000075	
16,830	17,000	.001115	.000120	.....	.....	
17,820	18,000	.001255	.000140	.000310	.000120	
18,810	19,000	.001400	.000145	.....	.....	
19,800	20,000	.001585	.000185	.000500	.000190	
20,680	20,690	.....	.....	.....	.....	Tensile strength.

Fractured at middle of stem.
Appearance, granular, coarse dark-colored spangles.

TENACITY SPECIMENS.

General marks, 12 M R_{26} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4504	M T_3 I	1.129	1.00	29,520	29,520	7.2962	14.05
4505	M T_4 O	1.129	1.00	28,040	28,040	7.3054	14.12
4506	M T_5 M	1.129	1.00	29,050	29,050	7.3063	14.76
4507	M T_6 O	1.129	1.00	31,530	31,530	7.2995	13.72

No. 877.

Marks, $^{12\ M\ R_2}_{M\ T_1}\ T\ R_1$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00008	.00004	.....	.....	
4,000	4,000	.00013	.00005	.....	.....	
5,000	5,000	.00018	.00005	0.	.....	
6,000	6,000	.00023	.00005	.....	.....	
7,000	7,000	.00028	.00005	.....	.....	
8,000	8,000	.00033	.00005	.....	.....	
9,000	9,000	.00039	.00006	.....	.....	
10,000	10,000	.00044	.00005	.00002	.00002	
11,000	11,000	.00049	.00005	.....	.....	
12,000	12,000	.00055	.00006	.....	.....	
13,000	13,000	.00061	.00006	.....	.....	
14,000	14,000	.00068	.00007	.....	.....	
15,000	15,000	.00073	.00005	.00007	.00005	
16,000	16,000	.00080	.00007	.....	.....	
17,000	17,000	.00087	.00007	.....	.....	
18,000	18,000	.00093	.00006	.....	.....	
19,000	19,000	.00101	.00008	.....	.....	
20,000	20,000	.00108	.00007	.00012	.00005	
21,000	21,000	.00116	.00008	.....	.....	
22,000	22,000	.00122	.00006	.....	.....	
23,000	23,000	.00131	.00009	.....	.....	
24,000	24,000	.00140	.00009	.....	.....	
25,000	25,000	.00151	.00011	.00032	.00020	
26,000	26,000	.00165	.00014	.....	.....	
27,000	27,000	.00180	.00015	.....	.....	
28,000	28,000	.00192	.00012	.....	.....	
29,000	29,000	.00208	.00016	.....	.....	
30,000	30,000	.00231	.00023	.00083	.00051	
31,000	31,000	.00258	.00027	.....	.....	
32,000	32,000	.00287	.00029	.....	.....	
33,000	33,000	.00318	.00031	.....	.....	
34,000	34,000	.00351	.00033	.....	.....	
35,000	35,000	.00403	.00052	.00223	.00140	
36,000	36,000	.00447	.00044	.....	.....	
37,000	37,000	.00487	.00040	.....	.....	
38,000	38,000	.00544	.00057	.....	.....	
39,000	39,000	.00588	.00044	.....	.....	
40,000	40,000	.00662	.00074	.00452	.00229	
51,100	51,100	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 879.

Marks, $\frac{12\ M\ R_{28}\ T\ R_2}{B\ R_{19}}$
Length, 9″.43.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00020	.00006	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00040	.00004	.....	.....	
10,000	10,000	.00046	.00006	.00002	.00002	
11,000	11,000	.00052	.00006	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00064	.00006	.....	.....	
14,000	14,000	.00070	.00006	.....	.....	
15,000	15,000	.00076	.00006	.00006	.00004	
16,000	16,000	.00082	.00006	.....	.....	
17,000	17,000	.00090	.00008	.....	.....	
18,000	18,000	.00096	.00006	.....	.....	
19,000	19,000	.00104	.00008	.....	.....	
20,000	20,000	.00110	.00006	.00014	.00008	
21,000	21,000	.00118	.00008	.....	.....	
22,000	22,000	.00124	.00006	.....	.....	
23,000	23,000	.00134	.00010	.....	.....	
24,000	24,000	.00144	.00010	.....	.....	
25,000	25,000	.00154	.00010	.00030	.00016	
26,000	26,000	.00164	.00010	.....	.....	
27,000	27,000	.00176	.00012	.....	.....	
28,000	28,000	.00190	.00014	.....	.....	
29,000	29,000	.00206	.00016	.....	.....	
30,000	30,000	.00226	.00020	.00076	.00046	
31,000	31,000	.00246	.00020	.....	.....	
32,000	32,000	.00266	.00020	.....	.....	
33,000	33,000	.00296	.00030	.....	.....	
34,000	34,000	.00334	.00038	.....	.....	
35,000	35,000	.00378	.00044	.00194	.00118	
36,000	36,000	.00416	.00038	.....	.....	
37,000	37,000	.00444	.00028	.....	.....	
38,000	38,000	.00512	.00068	.....	.....	
39,000	39,000	.00554	.00042	.....	.....	
40,000	40,000	.00604	.00050	.00390	.00196	
63,680	63,680	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 27.

No. 4299.

Marks, $\frac{12\,M\,R_{27}\,T\,R_1}{M\,T_3}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000055	.000055			
3,000	3,000	.000105	.000050			
4,000	4,000	.000170	.000065			
5,000	5,000	.000230	.000060	.000030	.000030	
6,000	6,000	.000285	.000055			
7,000	7,000	.000340	.000055			
8,000	8,000	.000405	.000065			
9,000	9,000	.000460	.000055			
10,000	10,000	.000515	.000055	.000055	.000025	
11,000	11,000	.000590	.000075			
12,000	12,000	.000655	.000065	.000085	.000030	
13,000	13,000	.000735	.000080			
14,000	14,000	.000800	.000065	.000110	.000025	
15,000	15,000	.000885	.000085			
16,000	16,000	.000970	.000085	.000155	.000045	
17,000	17,000	.001070	.000100			
18,000	18,000	.001185	.000115	.000240	.000085	
19,000	19,000	.001305	.000120			
20,000	20,000	.001445	.000140	.000360	.000120	
21,000	21,000	.001600	.000155			
22,000	22,000	.001840	.000240	.000600	.000240	
23,000	23,000	.002060	.000220			
24,000	24,000	.002400	.000340	.000990	.000390	
25,000	25,000	.002860	.000460	.001360	.000370	
26,940	26,940					Tensile strength.

Fractured 2¼″ from neck.
Appearance, granular, in part dark mottled.

TENACITY SPECIMENS.

General marks, 12 M R_{27} T R_1

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*		
4524	M T_3 I	1.129	1.00	30,260	30,260	7.2994	14.33
4525	M T_4 O	1.129	1.00	29,980	29,980	7.2936	15.05
4526	M T_3 M	1.129	1.00	29,010	29,010	7.3015	15.20
4527	M T_3 O	1.129	1.00	31,170	31,170	7.2972	14.40

R_2 T R_1
M T_1

″.
1″.129.
area, 1 square inch.
ength, 10″.

loads. Per square inch.	Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Pounds.	Inch.	Inch.	Inch.	Inch.	
	0.	0.	0.	0.	Initial load.
1,000	.00005	.00005			
2,000	.00010	.00005	.00005		
3,000	.00015	.00005	0.		
4,000	.00020	.00005			
5,000	.00025	.00005			
6,000	.00030	.00005		.00002	.00002
7,000	.00035	.00005	.00005		
8,000	.00040	.00005			
9,000	.00045	.00007			
10,000	.00050	.00006			
11,000	.00057	.00006	.00007	.00007	.00005
12,000	.00062	.00004			
13,000	.00068	.00007			
14,000	.00072	.00005			
15,000	.00079	.00006			
16,000	.00084	.00008	.00011	.00004	.00004
17,000	.00090	.00006			
18,000	.00098	.00007			
19,000	.00104	.00007			
20,000	.00111	.00007			
21,000	.00118	.00008	.00022	.00011	.00011
22,000	.00125	.00007			
23,000	.00132	.00010			
24,000	.00140	.00012			
25,000	.00152	.00012			
26,000	.00162	.00012	.00058	.00036	.00036
27,000	.00174	.00017			
28,000	.00186	.00025			
29,000	.00203	.00015			
30,000	.00228	.00022			
31,000	.00242	.00028	.00145	.00087	.00087
32,000	.00265	.00035			
33,000	.00293	.00043			
34,000	.00328	.00027			
35,000	.00371	.00050			
36,000	.00398	.00042	.00350	.00205	.00205 Ultimate
37,000	.00448	.00060			
38,000	.00490				
39,000	.00550				
40,000					
50,200					

Failed by triple flexure.

No. 4300.

Marks, $\frac{12\ M\ R_2\ T\ R_2}{B\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000155	.000055	.....	.....	
5,000	5,000	.000210	.000055	.000005	.000005	
6,000	6,000	.000270	.000060	.....	.....	
7,000	7,000	.000335	.000065	.....	.....	
8,000	8,000	.000395	.000060	.....	.....	
9,000	9,000	.000455	.000060	.....	.....	
10,000	10,000	.000525	.000070	.000040	.000035	
11,000	11,000	.000600	.000075	.....	.....	
12,000	12,000	.000675	.000075	.000060	.000020	
13,000	13,000	.000740	.000065	.....	.....	
14,000	14,000	.000830	.000090	.000100	.000040	
15,000	15,000	.000930	.000100	.....	.....	
16,000	16,000	.001015	.000085	.000155	.000055	
17,000	17,000	.001125	.000110	.....	.....	
18,000	18,000	.001250	.000125	.000240	.000085	
19,000	19,000	.001390	.000140	.....	.....	
20,000	20,000	.001555	.000165	.000395	.000155	
21,000	21,000	.001745	.000190	.....	.....	
22,000	22,000	.001980	.000235	.000645	.000250	
22,400	22,400	.002235	.000255	.....	.....	
23,000	23,000	.002590	.000355	.001080	.000435	
24,000	24,000	.003000	.000410	.001405	.000325	
25,000	25,000	.....	.....	.....	.....	
27,400	27,400					Tensile strength.

Fractured 5¼″ from neck.
Appearance, uniform granular.

No. 4301.

ks, 12 M R_7 T R_2
$B T_{11}$
gth of stem, 15″.75.
meter, 1″.129.
tional area, 1 square inch.
uged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	0.	0.	0.	0.	Initial load.
1,000	2,000	.00006	.00006			
2,000	3,000	.00011	.00005			
3,000	4,000	.00016	.00005	0.		
4,000	5,000	.00021	.00005			
5,000	6,000	.00027	.00006			
6,000	7,000	.00033	.00006			
7,000	8,000	.00039	.00006			
8,000	9,000	.00045	.00006	.00002	.00002	
9,000	10,000	.00050	.00005			
10,000	11,000	.00058	.00008	.00006	.00004	
11,000	12,000	.00066	.00008			
12,000	13,000	.00073	.00006	.00009	.00003	
13,000	14,000	.00080	.00008			
14,000	15,000	.00089	.00009	.00015	.00006	
15,000	16,000	.00099	.00010			
16,000	17,000	.00109	.00010	.00021	.00006	
17,000	18,000	.00121	.00012			
18,000	19,000	.00133	.00012	.00036	.00015	
19,000	20,000	.00148	.00015			
20,000	21,000	.00168	.00020	.00059	.00023	
21,000	22,000	.00187	.00019			
22,000	23,000	.00213	.00026	.00098	.00039	
23,000	24,000	.00242	.00029	.00131	.00033	Tensile strength.
24,000	25,000	.00287	.00045			
25,000	27,030					
27,030						

Fractured 7″.4 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_7 T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardn
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4528	B T_3 I	1.129	1.00	29,420	29,420	7.2988	
4529	B T_4 O	1.129	1.00	32,690	32,690		
4530	B T_5 M	1.129	1.00	30,070	30,070	7.3041	
4531	B L_6 I	1.129	1.00	29,960	29,960	7.3045	
4532	B L_7 O	1.129	1.00	31,240	31,240	7.3062	
	B L_8 M		1.00	31,500	31,500		

No. 886.

Marks, $\frac{12\ M\ R_2\ T\ R_2}{B\ T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00014	.00005	.....	.....	
5,000	5,000	.00019	.00005	.00001	.00001	
6,000	6,000	.00024	.00005	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00042	.00006	.....	.....	
10,000	10,000	.00047	.00005	.00002	.00001	
11,000	11,000	.00052	.00005	.....	.....	
12,000	12,000	.00058	.00006	.....	.....	
13,000	13,000	.00065	.00007	.....	.....	
14,000	14,000	.00071	.00006	.....	.....	
15,000	15,000	.00077	.00006	.00008	.00006	
16,000	16,000	.00084	.00007	.....	.....	
17,000	17,000	.00091	.00007	.....	.....	
18,000	18,000	.00098	.00007	.....	.....	
19,000	19,000	.00104	.00006	.....	.....	
20,000	20,000	.00111	.00007	.00015	.00007	
21,000	21,000	.00120	.00009	.....	.....	
22,000	22,000	.00129	.00009	.....	.....	
23,000	23,000	.00137	.00008	.....	.....	
24,000	24,000	.00147	.00010	.....	.....	
25,000	25,000	.00156	.00009	.00031	.00016	
26,000	26,000	.00167	.00011	.....	.....	
27,000	27,000	.00179	.00012	.....	.....	
28,000	28,000	.00191	.00012	.....	.....	
29,000	29,000	.00207	.00016	.....	.....	
30,000	30,000	.00222	.00014	.00070	.00039	
31,000	31,000	.00241	.00019	.....	.....	
32,000	32,000	.00267	.00026	.....	.....	
33,000	33,000	.00295	.00028	.....	.....	
34,000	34,000	.00321	.00026	.....	.....	
35,000	35,000	.00354	.00033	.00170	.00100	
36,000	36,000	.00400	.00046	.....	.....	
37,000	37,000	.00438	.00038	.....	.....	
38,000	38,000	.00482	.00044	.....	.....	
39,000	39,000	.00531	.00049	.....	.....	
40,000	40,000	.00581	.00050	.00371	.00201	
50,420	50,420	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 887.

Marks, $\frac{12\ M\ R_{27}\ T\ R_2}{B\ R_{10}}$
Length, 8″.31.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00010	.00004	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	.00002	.00002	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00030	.00004	.....	.....	
8,000	8,000	.00036	.00006	.....	.....	
9,000	9,000	.00044	.00008	.....	.....	
10,000	10,000	.00048	.00004	.00004	.00002	
11,000	11,000	.00054	.00006	.....	.....	
12,000	12,000	.00060	.00006	.....	.....	
13,000	13,000	.00064	.00004	.....	.....	
14,000	14,000	.00070	.00006	.....	.....	
15,000	15,000	.00076	.00006	.00010	.00006	
16,000	16,000	.00082	.00006	.....	.....	
17,000	17,000	.00090	.00008	.....	.....	
18,000	18,000	.00096	.00006	.....	.....	
19,000	19,000	.00102	.00006	.....	.....	
20,000	20,000	.00108	.00006	.00016	.00006	
21,000	21,000	.00116	.00008	.....	.....	
22,000	22,000	.00122	.00006	.....	.....	
23,000	23,000	.00130	.00008	.....	.....	
24,000	24,000	.00140	.00010	.....	.....	
25,000	25,000	.00156	.00010	.00028	.00012	
26,000	26,000	.00162	.00012	.....	.....	
27,000	27,000	.00172	.00010	.....	.....	
28,000	28,000	.00186	.00014	.....	.....	
29,000	29,000	.00200	.00014	.....	.....	
30,000	30,000	.00220	.00020	.00066	.00038	
31,000	31,000	.00240	.00020	.....	.....	
32,000	32,000	.00250	.00016	.....	.....	
33,000	33,000	.00284	.00028	.....	.....	
34,000	34,000	.00316	.00032	.....	.....	
35,000	35,000	.00350	.00034	.00168	.00102	
36,000	36,000	.00388	.00038	.....	.....	
37,000	37,000	.00424	.00036	.....	.....	
38,000	38,000	.00470	.00046	.....	.....	
39,000	39,000	.00530	.00060	.....	.....	
40,000	40,000	.00580	.00050	.00364	.00196	
70,040	70,040	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 882.

Marks, $\frac{12\,M\,R_2\,T\,R^1}{M\,T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00016	.00005	.....	.....	
5,000	5,000	.00021	.00005	0.	.....	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00036	.00005	.....	.....	
9,000	9,000	.00041	.00005	.....	.....	
10,000	10,000	.00047	.00006	.00002	.00002	
11,000	11,000	.00053	.00006	.....	.....	
12,000	12,000	.00058	.00005	.....	.....	
13,000	13,000	.00063	.00005	.....	.....	
14,000	14,000	.00069	.00006	.....	.....	
15,000	15,000	.00076	.00007	.00007	.00005	
16,000	16,000	.00081	.00005	.....	.....	
17,000	17,000	.00087	.00006	.....	.....	
18,000	18,000	.00093	.00006	.....	.....	
19,000	19,000	.00099	.00006	.....	.....	
20,000	20,000	.00107	.00008	.00012	.00005	
21,000	21,000	.00115	.00008	.....	.....	
22,000	22,000	.00122	.00007	.....	.....	
23,000	23,000	.00129	.00007	.....	.....	
24,000	24,000	.00137	.00008	.....	.....	
25,000	25,000	.00147	.00010	.00025	.00013	
26,000	26,000	.00157	.00010	.....	.....	
27,000	27,000	.00167	.00010	.....	.....	
28,000	28,000	.00178	.00011	.....	.....	
29,000	29,000	.00191	.00013	.....	.....	
30,000	30,000	.00209	.00018	.00061	.00036	
31,000	31,000	.00230	.00021	.....	.....	
32,000	32,000	.00248	.00018	.....	.....	
33,000	33,000	.00270	.00022	.....	.....	
34,000	34,000	.00287	.00017	.....	.....	
35,000	35,000	.00347	.00060	.00174	.00113	
36,000	36,000	.00383	.00036	.....	.....	
37,000	37,000	.00411	.00028	.....	.....	
38,000	38,000	.00462	.00051	.....	.....	
39,000	39,000	.00508	.00046	.....	.....	
40,000	40,000	.00561	.00053	.00355	.00185	
51,960	51,960	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4198.

Marks, $\frac{12\ M\ R_2\ T\ R_2}{B\ T_1}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050			
3,000	3,000	.000100	.000050			
4,000	4,000	.000160	.000060			
5,000	5,000	.000220	.000060	0.		
6,000	6,000	.000280	.000060			
7,000	7,000	.000335	.000055			
8,000	8,000	.000395	.000060			
9,000	9,000	.000450	.000055			
10,000	10,000	.000525	.000075	.000035	.000035	
11,000	11,000	.000585	.000060			
12,000	12,000	.000660	.000075	.000060	.000025	
13,000	13,000	.000740	.000080			
14,000	14,000	.000810	.000070	.000090	.000030	
15,000	15,000	.000900	.000090			
16,000	16,000	.000995	.000095	.000145	.000055	
17,000	17,000	.001095	.000100			
18,000	18,000	.001220	.000125	.000230	.000085	
19,000	19,000	.001350	.000130			
20,000	20,000	.001500	.000150	.000360	.000130	
21,000	21,000	.001700	.000200			
22,000	22,000	.001910	.000210	.000600	.000240	
23,000	23,000	.002195	.000285			
24,000	24,000	.002520	.000325	.001030	.000430	
25,000	25,000	.002865	.000345	.001310	.000280	
26,170	26,170					Ultimate strength.

Fractured 5″ from neck.
Appearance, uniform granular.

No. 4199.

Marks, $\frac{12\ M\ R_{28}\ T\ R_2}{B\ T_{11}}$
Length of stem, 15″.75.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remar
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	
2,000	2,000	.00006	.00006	.....	.....	Initial load.
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00016	.00005	.....	.....	
5,000	5,000	.00021	.00005	0.	.....	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00032	.00006	.....	.....	
8,000	8,000	.00038	.00006	.....	.....	
9,000	9,000	.00044	.00006	.....	.....	
10,000	10,000	.00050	.00006	.00003	.00003	
11,000	11,000	.00057	.00007	.....	.....	
12,000	12,000	.00064	.00007	.00006	.00003	
13,000	13,000	.00072	.00008	.....	.....	
14,000	14,000	.00079	.00007	.00008	.00002	
15,000	15,000	.00088	.00009	.....	.....	
16,000	16,000	.00097	.00009	.00022	.00004	
17,000	17,000	.00107	.00010	.....	.....	
18,000	18,000	.00117	.00010	.00019	.00007	
19,000	19,000	.00129	.00013	.....	.....	
20,000	20,000	.00142	.00013	.00032	.00013	
21,000	21,000	.00158	.00016	.....	.....	
22,000	22,000	.00177	.00019	.00052	.00020	
23,000	23,000	.00203	.00026	.....	.....	
24,000	24,000	.00231	.00028	.00088	.00036	
25,000	25,000	.00265	.00034	.00113	.00025	
28,180	28,180	.....	.....	.....	.....	Tensile streng

Fractured ½″ from middle of stem.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{28} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.
				Total.	Per square inch.	
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
4518	B T_3 I	1.129	1.00	30,680	30,680	.....
4519	B T_4 O	1.129	1.00	32,050	32,050	7.3132
4520	B T_5 M	1.129	1.00	30,040	30,040	.....
4521	B L_6 I	1.129	1.00	30,520	30,520	7.3137
4522	B L_7 O	1.129	1.00	31,640	31,640	7.3168
4523	B L_8 M	1.129	1.00	31,970	31,970	7.3157

No. 884.

Marks, $\frac{12\ M\ R_{22}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.29.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00028	.00004	.....	.....	
8,000	8,000	.00034	.00006	.....	.....	
9,000	9,000	.00040	.00006	.....	.....	
10,000	10,000	.00044	.00004	0.	.....	
11,000	11,000	.00050	.00006	.....	.....	
12,000	12,000	.00056	.00006	.....	.....	
13,000	13,000	.00062	.00006	.....	.....	
14,000	14,000	.00068	.00006	.....	.....	
15,000	15,000	.00074	.00006	.00006	.00006	
16,000	16,000	.00080	.00006	.....	.....	
17,000	17,000	.00086	.00006	.....	.....	
18,000	18,000	.00092	.00006	.....	.....	
19,000	19,000	.00100	.00008	.....	.....	
20,000	20,000	.00106	.00006	.00010	.00004	
21,000	21,000	.00114	.00008	.....	.....	
22,000	22,000	.00122	.00008	.....	.....	
23,000	23,000	.00130	.00008	.....	.....	
24,000	24,000	.00138	.00008	.....	.....	
25,000	25,000	.00148	.00010	.00026	.00016	
26,000	26,000	.00160	.00012	.....	.....	
27,000	27,000	.00170	.00010	.....	.....	
28,000	28,000	.00184	.00014	.....	.....	
29,000	29,000	.00198	.00014	.....	.....	
30,000	30,000	.00218	.00020	.00068	.00042	
31,000	31,000	.00238	.00020	.....	.....	
32,000	32,000	.00260	.00022	.....	.....	
33,000	33,000	.00280	.00020	.....	.....	
34,000	34,000	.00314	.00034	.....	.....	
35,000	35,000	.00348	.00034	.00168	.00100	
36,000	36,000	.00386	.00038	.....	.....	
37,000	37,000	.00420	.00034	.....	.....	
38,000	38,000	.00470	.00050	.....	.....	
39,000	39,000	.00512	.00042	.....	.....	
40,000	40,000	.00566	.00054	.00356	.00188	
61,040	61,040	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 29.

No. 4159.

Marks, $\frac{12\ M\ R_{29}\ T\ R_1}{M\ R_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000355	.000050	.....	.....	
9,000	9,000	.000415	.000060	.....	.....	
10,000	10,000	.000475	.000060	.000025	.000025	
11,000	11,000	.000530	.000055	.....	.....	
12,000	12,000	.000600	.000070	.000040	.000015	
13,000	13,000	.000660	.000060	.....	.....	
14,000	14,000	.000730	.000070	.000075	.000035	
15,000	15,000	.000810	.000080	.....	.....	
16,000	16,000	.000885	.000075	.000115	.000040	
17,000	17,000	.000985	.000100	.....	.....	
18,000	18,000	.001085	.000100	.000180	.000065	
19,000	19,000	.001205	.000120	.....	.....	
20,000	20,000	.001320	.000115	.000305	.000125	
21,000	21,000	.001470	.000150	.....	.....	
22,000	22,000	.001660	.000190	.000505	.000200	
23,000	23,000	.001920	.000260	.....	.....	
24,000	24,000	.002170	.000250	.000860	.000355	
25,000	25,000	.002610	.000440	.001210	.000350	
27,510	27,510	.....	.....	.....	.....	Tensile strength.

Fractured 2″ from the neck.
Appearance, granular mottled.

TENACITY SPECIMENS.

General marks, 12 M R_{29} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4480	M T_3 I	1.129	1.00	31,540	31,540	7.3389	15.59
4481	M T_4 O	1.129	1.00	30,010	30,010	7.3327	14.98
4482	M T_5 M	1.129	1.00	28,400	28,400	7.3349	15.51
4483	M T_6 O	1.129	1.00	32,720	32,720	7.3350	14.98

No. 872.

Marks, $^{12\ M\ R_2\ T\ R_1}_{M\ T_1}$
Length, 12″.
Diameter, 1″.120.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00013	.00004	.....	.....	
5,000	5,000	.00018	.00005	0.	.....	
6,000	6,000	.00023	.00005	.....	.....	
7,000	7,000	.00028	.00005	.....	.....	
8,000	8,000	.00032	.00004	.....	.....	
9,000	9,000	.00037	.00005	.....	.....	
10,000	10,000	.00042	.00005	.0.001	.00.01	
11,000	11,000	.00048	.00006	.....	.....	
12,000	12,000	.00053	.00005	.....	.....	
13,000	13,000	.00058	.00005	.....	.....	
14,000	14,000	.00063	.00005	.....	.....	
15,000	15,000	.00069	.00006	.00003	.00003	
16,000	16,000	.00073	.00004	.....	.....	
17,000	17,000	.00079	.00006	.....	.....	
18,000	18,000	.00084	.00005	.....	.....	
19,000	19,000	.00091	.00007	.....	.....	
20,000	20,000	.00099	.00008	.00012	.00009	
21,000	21,000	.00105	.00006	.....	.....	
22,000	22,000	.00112	.00007	.....	.....	
23,000	23,000	.00120	.00008	.....	.....	
24,000	24,000	.00129	.00009	.....	.....	
25,000	25,000	.00139	.00010	.00025	.00013	
26,000	26,000	.00149	.00010	.....	.....	
27,000	27,000	.00160	.00011	.....	.....	
28,000	28,000	.00172	.00012	.....	.....	
29,000	29,000	.00189	.00017	.....	.....	
30,000	30,000	.00203	.00014	.00089	.00064	
31,000	31,000	.00232	.00029	.....	.....	
32,000	32,000	.00252	.00020	.....	.....	
33,000	33,000	.00278	.00026	.....	.....	
34,000	34,000	.00312	.00034	.....	.....	
35,000	35,000	.00363	.00051	.00193	.00121	
36,000	36,000	.00403	.00040	.....	.....	
37,000	37,000	.00442	.00039	.....	.....	
38,000	38,000	.00483	.00041	.....	.....	
39,000	39,000	.00534	.00051	.....	.....	
40,000	40,000	.00590	.00056	.00393	.00200	
51,450	51,450	.....	.....	.....	.....	Ultimate stre

Failed by triple flexure.

No. 4158.

Marks, $^{12\ M\ R_{29}\ T\ R_2}_{B\ T_{11}}$
Length of stem, 15″.75.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	.....	.....	
3,000	3,000	.00010	.00005	.....	.....	
4,000	4,000	.00015	.00005	.....	.....	
5,000	5,000	.00020	.00005	0.	.....	
6,000	6,000	.00026	.00006	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00036	.00005	.....	.....	
9,000	9,000	.00041	.00005	.....	.....	
10,000	10,000	.00048	.00007	.00002	.00002	
11,000	11,000	.00054	.00006	.....	.....	
12,000	12,000	.00060	.00006	.00006	.00004	
13,000	13,000	.00066	.00006	.....	.....	
14,000	14,000	.00073	.00007	.00007	.00001	
15,000	15,000	.00081	.00008	.....	.....	
16,000	16,000	.00089	.00008	.00011	.00004	
17,000	17,000	.00098	.00009	.....	.....	
18,000	18,000	.00107	.00009	.00018	.00007	
19,000	19,000	.00117	.00010	.....	.....	
20,000	20,000	.00130	.00013	.00028	.00010	
21,000	21,000	.00142	.00012	.....	.....	
22,000	22,000	.00159	.00017	.00044	.00016	
23,000	23,000	.00179	.00020	.....	.....	
24,000	24,000	.00201	.00022	.00071	.00027	
25,000	25,000	.00239	.00038	.00099	.00028	
25,640	25,640	.....	.....	.....	.....	Tensile strength.

Fractured 6″ from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{29} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4474	B T_1I	1.129	1.00	29,810	29,810	.....	.....
4475	B T_1O	1.129	1.00	32,670	32,670	7.3319	15.75
4476	B T_1M	1.129	1.00	30,650	30,650	.....	.....
4477	B L_6I	1.129	1.00	32,290	32,290	7.3452	15.50
4478	B L_7O	1.129	1.00	32,070	32,070	7.3427	16.73
4479	B L_8M	1.129	1.00	32,020	32,020	7.3436	15.59

No. 870.

Marks, $^{12\ M\ R_2\ T\ R_2}_{B\ T_2}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Tensile load.
2, 000	2, 000	.00004	.00004	.....	.....	
3, 000	3, 000	.00008	.00004	.....	.....	
4, 000	4, 000	.00013	.00005	.....	.....	
5, 000	5, 000	.00018	.00005	0.	.....	
6, 000	6, 000	.00023	.00005	.....	.....	
7, 000	7, 000	.00029	.00006	.....	.....	
8, 000	8, 000	.00034	.00005	.....	.....	
9, 000	9, 000	.00040	.00006	.....	.....	
10, 000	10, 000	.00045	.00005	.00002	.00002	
11, 000	11, 000	.00050	.00005	.....	.....	
12, 000	12, 000	.00056	.00006	.....	.....	
13, 000	13, 000	.00062	.00006	.....	.....	
14, 000	14, 000	.00068	.00006	.....	.....	
15, 000	15, 000	.00073	.00005	.00007	.00005	
16, 000	16, 000	.00078	.00005	.....	.....	
17, 000	17, 000	.00083	.00005	.....	.....	
18, 000	18, 000	.00090	.00007	.....	.....	
19, 000	19, 000	.00097	.00007	.....	.....	
20, 000	20, 000	.00102	.00005	.00011	.00004	
21, 000	21, 000	.00110	.00008	.....	.....	
22, 000	22, 000	.00117	.00007	.....	.....	
23, 000	23, 000	.00124	.00007	.....	.....	
24, 000	24, 000	.00130	.00006	.....	.....	
25, 000	25, 000	.00139	.00009	.00024	.00013	
26, 000	26, 000	.00150	.00011	.....	.....	
27, 000	27, 000	.00161	.00011	.....	.....	
28, 000	28, 000	.00171	.00010	.....	.....	
29, 000	29, 000	.00184	.00013	.....	.....	
30, 000	30, 000	.00201	.00017	.00058	.00034	
31, 000	31, 000	.00221	.00020	.....	.....	
32, 000	32, 000	.00238	.00017	.....	.....	
33, 000	33, 000	.00260	.00022	.....	.....	
34, 000	34, 000	.00292	.00032	.....	.....	
35, 000	35, 000	.00326	.00034	.00157	.00099	
36, 000	36, 000	.00360	.00034	.....	.....	
37, 000	37, 000	.00395	.00035	.....	.....	
38, 000	38, 000	.00433	.00038	.....	.....	
39, 000	39, 000	.00480	.00047	.....	.....	
40, 000	40, 000	.00553	.00053	.00333	.00176	
52, 060	52, 060	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 871.

Marks, $\frac{12\ MR_{29}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00016	.00006	.....	.....	
5,000	5,000	.00020	.00004	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00028	.00004	.....	.....	
8,000	8,000	.00034	.00006	.....	.....	
9,000	9,000	.00040	.00006	.....	.....	
10,000	10,000	.00044	.00004	.00004	.00004	
11,000	11,000	.00050	.00006	.....	.....	
12,000	12,000	.00054	.00004	.....	.....	
13,000	13,000	.00060	.00006	.....	.....	
14,000	14,000	.00064	.00004	.....	.....	
15,000	15,000	.00070	.00006	.00004	0.	
16,000	16,000	.00078	.00008	.....	.....	
17,000	17,000	.00082	.00004	.....	.....	
18,000	18,000	.00088	.00006	.....	.....	
19,000	19,000	.00094	.00006	.....	.....	
20,000	20,000	.00100	.00006	.00010	.00006	
21,000	21,000	.00108	.00008	.....	.....	
22,000	22,000	.00114	.00006	.....	.....	
23,000	23,000	.00122	.00008	.....	.....	
24,000	24,000	.00130	.00008	.....	.....	
25,000	25,000	.00138	.00008	.00024	.00014	
26,000	26,000	.00148	.00010	.....	.....	
27,000	27,000	.00158	.00010	.....	.....	
28,000	28,000	.00168	.00010	.....	.....	
29,000	29,000	.00182	.00014	.....	.....	
30,000	30,000	.00200	.00018	.00062	.00038	
31,000	31,000	.00226	.00026	.....	.....	
32,000	32,000	.00240	.00014	.....	.....	
33,000	33,000	.00264	.00024	.....	.....	
34,000	34,000	.00294	.00030	.....	.....	
35,000	35,000	.00338	.00044	.00168	.00106	
36,000	36,000	.00372	.00034	.....	.....	
37,000	37,000	.00404	.00032	.....	.....	
38,000	38,000	.00448	.00044	.....	.....	
39,000	39,000	.00500	.00052	.....	.....	
40,000	40,000	.00554	.00054	.00354	.00186	
62,500	62,500	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, No. 30.

No. 4169.

Marks, $^{12\ M\ R_{30}\ T\ R_1}_{M\ T_2}$
Length of stem, 23″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 20″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.000050	.000050	.....	.....	
3,000	3,000	.000100	.000050	.....	.....	
4,000	4,000	.000150	.000050	.....	.....	
5,000	5,000	.000200	.000050	0.	.....	
6,000	6,000	.000250	.000050	.....	.....	
7,000	7,000	.000305	.000055	.....	.....	
8,000	8,000	.000355	.000050	.....	.....	
9,000	9,000	.000415	.000060	.....	.....	
10,000	10,000	.000480	.000065	.000035	.000035	
11,000	11,000	.000540	.000060	.....	.....	
12,000	12,000	.000605	.000065	.000050	.000015	
13,000	13,000	.000675	.000070	.....	.....	
14,000	14,000	.000755	.000080	.000090	.000040	
15,000	15,000	.000835	.000080	.....	.....	
16,000	16,000	.000910	.000075	.000135	.000045	
17,000	17,000	.001010	.000100	.....	.....	
18,000	18,000	.001110	.000100	.000210	.000075	
19,000	19,000	.001220	.000110	.....	.....	
20,000	20,000	.001360	.000140	.000310	.000100	
21,000	21,000	.001540	.000180	.....	.....	
22,000	22,000	.001725	.000185	.000340	.000230	
23,000	23,000	.001965	.000240	.....	.....	
23,980	23,980	.....	.....	.....	.....	Tensile strength.

Fractured 10″.75 from neck. Appearance granular; 50 per cent. of fractured surface contains dark colored spangles.

TENACITY SPECIMENS.

General marks, 12 M R_{30} T R_1.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4484	M T_2 I	1.129	1.00	29,630	29,630	7.3156	14.26
4485	M T_1 O	1.129	1.00	29,470	29,470	7.3185	14.12
4486	M T_2 M	1.129	1.00	30,260	30,260	7.3250	14.76
4487	M T_2 O	1.129	1.00	31,940	31,940	7.3245	14.40

No. 873.

Marks, $^{12\,M\,R_{29}\,T\,R_1}_{M\,T_1}$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00014	.00005	.....	.....	
5,000	5,000	.00019	.00005	0.	.....	
6,000	6,000	.00024	.00005	.....	.....	
7,000	7,000	.00029	.00005	.....	.....	
8,000	8,000	.00034	.00005	.....	.....	
9,000	9,000	.00039	.00005	.....	.....	
10,000	10,000	.00045	.00006	0.	.....	
11,000	11,000	.00049	.00004	.....	.....	
12,000	12,000	.00056	.00007	.....	.....	
13,000	13,000	.00060	.00004	.....	.....	
14,000	14,000	.00066	.00006	.....	.....	
15,000	15,000	.00071	.00005	.00006	.00006	
16,000	16,000	.00077	.00006	.....	.....	
17,000	17,000	.00085	.00008	.....	.....	
18,000	18,000	.00090	.00005	.....	.....	
19,000	19,000	.00097	.00007	.....	.....	
20,000	20,000	.00103	.00006	.00010	.00004	
21,000	21,000	.00110	.00007	.....	.....	
22,000	22,000	.00119	.00009	.....	.....	
23,000	23,000	.00126	.00007	.....	.....	
24,000	24,000	.00136	.00010	.....	.....	
25,000	25,000	.00145	.00009	.00028	.00018	
26,000	26,000	.00156	.00011	.....	.....	
27,000	27,000	.00166	.00010	.....	.....	
28,000	28,000	.00178	.00012	.....	.....	
29,000	29,000	.00195	.00017	.....	.....	
30,000	30,000	.00215	.00020	.00069	.00041	
31,000	31,000	.00240	.00025	.....	.....	
32,000	32,000	.00260	.00020	.....	.....	
33,000	33,000	.00288	.00028	.....	.....	
34,000	34,000	.00321	.00033	.....	.....	
35,000	35,000	.00355	.00034	.00183	.00114	
36,000	36,000	.00399	.00044	.....	.....	
37,000	37,000	.00450	.00051	.....	.....	
38,000	38,000	.00503	.00053	.....	.....	
39,000	39,000	.00552	.00049	.....	.....	
40,000	40,000	.00621	.00069	.00417	.00234	
50,780	50,780	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4168.

Marks, $\frac{12\ M\ R_{30}\ T\ R_2}{B\ T_{11}}$
Length of stem 15″.75.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00016	.00005	.....	.....	
5,000	5,000	.00021	.00005	0.	.....	
6,000	6,000	.00028	.00007	.....	.....	
7,000	7,000	.00035	.00007	.....	.....	
8,000	8,000	.00040	.00005	.....	.....	
9,000	9,000	.00045	.00005	.....	.....	
10,000	10,000	.00050	.00005	.00005	.00005	
11,000	11,000	.00056	.00006	.....	.....	
12,000	12,000	.00064	.00008	.00007	.00002	
13,000	13,000	.00070	.00006	.....	.....	
14,000	14,000	.00079	.00009	.00009	.00002	
15,000	15,000	.00088	.00009	.....	.....	
16,000	16,000	.00098	.00010	.00014	.00005	
17,000	17,000	.00108	.00010	.....	.....	
18,000	18,000	.00120	.00012	.00022	.00008	
19,000	19,000	.00132	.00012	.....	.....	
20,000	20,000	.00147	.00015	.00037	.00015	
21,000	21,000	.00164	.00017	.....	.....	
22,000	22,000	.00182	.00018	.00057	.00020	
23,000	23,000	.00208	.00026	.....	.....	
24,000	24,000	.00240	.00032	.00098	.00041	
25,000	25,000	.00280	.00040	.00127	.00029	
27,710	27,710	.....	.....	.....	.....	Tensile strength.

Fractured 2″ from neck.
Appearance, granular, with dark-colored spangles.

TENACITY SPECIMENS.

General marks, 12 M R_{30} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4488	B T_3 I	1.129	1.00	29,610	29,610	.....	.....
4489	B T_4 O	1.129	1.00	34,310	34,310	7.3350	13.1[illegible]
4490	B T_5 M	1.129	1.00	30,300	30,300	.....	.....
4491	B L_6 I	1.129	1.00	29,820	29,820	7.3297	14.9[illegible]
4492	B L_7 O	1.129	1.00	32,240	32,240	7.3277	15.2[illegible]
4493	B L_8 M	1.129	1.00	32,980	32,980	7.3212	14.2[illegible]

No. 875.

Marks, $\frac{12\ M\ R_{20}\ T\ R_2}{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Ganged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
1,000	1,000	0.	0.	0.	0.	
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00018	.00004	.00002	.00002	
6,000	6,000	.00024	.00006	.....	.....	
7,000	7,000	.00030	.00006	.....	.....	
8,000	8,000	.00034	.00004	.....	.....	
9,000	9,000	.00038	.00004	.....	.....	
10,000	10,000	.00044	.00006	.00002	0.	
11,000	11,000	.00050	.00006	.....	.....	
12,000	12,000	.00056	.00006	.....	.....	
13,000	13,000	.00060	.00004	.....	.....	
14,000	14,000	.00066	.00006	.....	.....	
15,000	15,000	.00072	.00006	.00010	.00008	
16,000	16,000	.00078	.00006	.....	.....	
17,000	17,000	.00082	.00004	.....	.....	
18,000	18,000	.00090	.00008	.....	.....	
19,000	19,000	.00096	.00006	.....	.....	
20,000	20,000	.00102	.00006	.00012	.00002	
21,000	21,000	.00110	.00008	.....	.....	
22,000	22,000	.00116	.00006	.....	.....	
23,000	23,000	.00126	.00010	.....	.....	
24,000	24,000	.00132	.00006	.....	.....	
25,000	25,000	.00140	.00008	.00026	.00014	
26,000	26,000	.00150	.00010	.....	.....	
27,000	27,000	.00160	.00010	.....	.....	
28,000	28,000	.00172	.00012	.....	.....	
29,000	29,000	.00186	.00014	.....	.....	
30,000	30,000	.00202	.00016	.00060	.00034	
31,000	31,000	.00230	.00028	.....	.....	
32,000	32,000	.00248	.00018	.....	.....	
33,000	33,000	.00270	.00022	.....	.....	
34,000	34,000	.00302	.00032	.....	.....	
35,000	35,000	.00330	.00028	.00162	.00102	
36,000	36,000	.00380	.00050	.....	.....	
37,000	37,000	.00414	.00034	.....	.....	
38,000	38,000	.00458	.00044	.....	.....	
39,000	39,000	.00504	.00046	.....	.....	
40,000	40,000	.00552	.00048	.00350	.00188	
61,050	61,050	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST-IRON BODY, NO. 31.

No. 4293.

rks, $\frac{12\,M\,R_{31}\,T\,R_1}{M\,T_2}$
gth of stem, 23″.
neter, 1″.129.
ional area, 1 square inch.
ged length, 20″.

ied loads. Per square inch.	Elongation per inch.	Successive elongation per inch	Permanent set.	Successive permanent set.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	0.	0.	0.	0.	Initial load.
2,000	.000055	.000055			
3,000	.000105	.000050			
4,000	.000160	.000055			
5,000	.000210	.000050	.000010	.000010	
6,000	.000260	.000050			
7,000	.000320	.000060			
8,000	.000370	.000050			
9,000	.000430	.000060			
10,000	.000480	.000050	.000035	.000025	
11,000	.000545	.000065			
12,000	.000615	.000070	.000050	.000015	
13,000	.000675	.000060			
14,000	.000745	.000070	.000080	.000030	
15,000	.000815	.000070			
16,000	.000900	.000085	.000125	.000045	
17,000	.000985	.000085			
18,000	.001085	.000100	.000180	.000055	
19,000	.001190	.000105			
20,000	.001300	.000110	.000280	.000100	
21,000	.001450	.000150			
22,000	.001610	.000160	.000450	.000170	
23,000	.001825	.000215			
24,000	.002055	.000230	.000765	.000315	
25,000	.002410	.000355	.001020	.000255	
28,990					Tensile strength.

ured 1″ from neck.
rance, granular, dark mottled.

TENACITY SPECIMENS.

ral marks, 12 M R_{31} T R_1.

Additional marks.	Diameter.	Sectional area.	Tensile strength. Total.	Tensile strength. Per square inch.	Specific gravity.	Hardness.
	Inches.	*Sq. inches.*	*Pounds.*	*Pounds.*		
M T_3 I	1.129	1.00	31,070	31,070	7.3366	14.83
M T_4 O	1.129	1.00	30,250	30,250	7.3281	14.69
M T_5 M	1.129	1.00	29,870	29,870	7.3326	15.28
M T_6 O	1.129	1.00	33,450	33,450	7.3368	14.12

No. 876.

Marks, $^{12\,M\,R_2}_{M\,T_1}\,T\,R_1$
Length, 12″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00009	.00005	.....	.....	
4,000	4,000	.00013	.00004	.....	.....	
5,000	5,000	.00018	.00005	0.	.....	
6,000	6,000	.00022	.00004	.....	.....	
7,000	7,000	.00027	.00005	.....	.....	
8,000	8,000	.00032	.00005	.....	.....	
9,000	9,000	.00038	.00006	.....	.....	
10,000	10,000	.00042	.00004	.00001	.00001	
11,000	11,000	.00048	.00006	.....	.....	
12,000	12,000	.00053	.00005	.....	.....	
13,000	13,000	.00058	.00005	.....	.....	
14,000	14,000	.00063	.00005	.....	.....	
15,000	15,000	.00068	.00005	.00004	.00003	
16,000	16,000	.00073	.00005	.....	.....	
17,000	17,000	.00080	.00007	.....	.....	
18,000	18,000	.00088	.00008	.....	.....	
19,000	19,000	.00094	.00006	.....	.....	
20,000	20,000	.00099	.00005	.00010	.00006	
21,000	21,000	.00105	.00006	.....	.....	
22,000	22,000	.00122	.00007	.....	.....	
23,000	23,000	.00119	.00007	.....	.....	
24,000	24,000	.00127	.00008	.....	.....	
25,000	25,000	.00138	.00011	.00021	.00011	
26,000	26,000	.00148	.00010	.....	.....	
27,000	27,000	.00158	.00010	.....	.....	
28,000	28,000	.00169	.00011	.....	.....	
29,000	29,000	.00182	.00013	.....	.....	
30,000	30,000	.00199	.00017	.00058	.00037	
31,000	31,000	.00218	.00019	.....	.....	
32,000	32,000	.00242	.00024	.....	.....	
33,000	33,000	.00260	.00018	.....	.....	
34,000	34,000	.00300	.00040	.....	.....	
35,000	35,000	.00340	.00040	.00170	.00112	
36,000	36,000	.00380	.00040	.....	.....	
37,000	37,000	.00413	.00033	.....	.....	
38,000	38,000	.00453	.00040	.....	.....	
39,000	39,000	.00500	.00047	.....	.....	
40,000	40,000	.00582	.00082	.00378	.00268	
51,720	51,720	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 4295.

Marks, $^{12\ M\ R_{31}\ T\ R_2}_{B\ T_{11}}$
Length of stem, 15″.75.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	.....	.....	
3,000	3,000	.00011	.00005	.....	.....	
4,000	4,000	.00016	.00005	.....	.....	
5,000	5,000	.00021	.00005	0.	.....	
6,000	6,000	.00026	.00005	.....	.....	
7,000	7,000	.00031	.00005	.....	.....	
8,000	8,000	.00037	.00006	.....	.....	
9,000	9,000	.00042	.00005	.....	.....	
10,000	10,000	.00047	.00005	.00002	.00002	
11,000	11,000	.00052	.00005	.....	.....	
12,000	12,000	.00058	.00006	.00005	.00003	
13,000	13,000	.00065	.00007	.....	.....	
14,000	14,000	.00071	.00006	.00007	.00002	
15,000	15,000	.00078	.00007	.....	.....	
16,000	16,000	.00085	.00007	.00010	.00003	
17,000	17,000	.00092	.00007	.....	.....	
18,000	18,000	.00100	.00008	.00014	.00004	
19,000	19,000	.01110	.00010	.....	.....	
20,000	20,000	.00122	.00012	.00022	.00008	
21,000	21,000	.00133	.00011	.....	.....	
22,000	22,000	.00148	.00015	.00036	.00014	
23,000	23,000	.00162	.00014	.....	.....	
24,000	24,000	.00180	.00018	.00057	.00021	
25,000	25,000	.00210	.00030	.00076	.00019	
32,210	32,210	.....	.....	.....	.....	Tensile strength.

Fractured ″.75 from neck.
Appearance, uniform granular.

TENACITY SPECIMENS.

General marks, 12 M R_{31} T R_2.

No. of test.	Additional marks.	Diameter.	Sectional area.	Tensile strength.		Specific gravity.	Hardness.
				Total.	Per square inch.		
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*		
4498	B T_3 I	1.129	1.00	32,530	32,530	.....	.....
4499	B T_4 O	1.129	1.00	34,990	34,990	7.3352	14.47
4500	B T_5 M	1.129	1.00	35,620	35,620	.....	.....
4501	B L_6 I	1.129	1.00	35,840	35,840	7.3486	14.90
4502	B L_7 O	1.129	1.00	34,270	34,270	7.3390	15.20
4503	B L_8 M	1.129	1.00	37,310	37,310	7.3475	16.31

No. 881.

Marks, $^{12\ M\ R_{11}\ T\ R_2}_{B\ R_{10}}$
Length, 10″.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 5″.

Applied loads.		Compression per inch.	Successive compression per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	.....	.....	
3,000	3,000	.00010	.00006	.....	.....	
4,000	4,000	.00014	.00004	.....	.....	
5,000	5,000	.00020	.00006	0.	.....	
6,000	6,000	.00024	.00004	.....	.....	
7,000	7,000	.00028	.00004	.....	.....	
8,000	8,000	.00034	.00006	.....	.....	
9,000	9,000	.00038	.00004	.....	.....	
10,000	10,000	.00042	.00004	0.	.....	
11,000	11,000	.00046	.00004	.....	.....	
12,000	12,000	.00052	.00006	.....	.....	
13,000	13,000	.00058	.00006	.....	.....	
14,000	14,000	.00062	.00004	.....	.....	
15,000	15,000	.00068	.00006	.00004	.00004	
16,000	16,000	.00072	.00004	.....	.....	
17,000	17,000	.00078	.00006	.....	.....	
18,000	18,000	.00084	.00006	.....	.....	
19,000	19,000	.00090	.00006	.....	.....	
20,000	20,000	.00098	.00008	.00006	.00002	
21,000	21,000	.00104	.00006	.....	.....	
22,000	22,000	.00110	.00006	.....	.....	
23,000	23,000	.00116	.00006	.....	.....	
24,000	24,000	.00124	.00008	.....	.....	
25,000	25,000	.00132	.00008	.00020	.00014	
26,000	26,000	.00142	.00010	.....	.....	
27,000	27,000	.00152	.00010	.....	.....	
28,000	28,000	.00162	.00010	.....	.....	
29,000	29,000	.00174	.00012	.....	.....	
30,000	30,000	.00192	.00018	.00050	.00030	
31,000	31,000	.00210	.00018	.....	.....	
32,000	32,000	.00230	.00020	.....	.....	
33,000	33,000	.00250	.00020	.....	.....	
34,000	34,000	.00284	.00034	.....	.....	
35,000	35,000	.00320	.00036	.00152	.00102	
36,000	36,000	.00356	.00036	.....	.....	
37,000	37,000	.00384	.00028	.....	.....	
38,000	38,000	.00434	.00050	.....	.....	
39,000	39,000	.00486	.00052	.....	.....	
40,000	40,000	.00542	.00056	.00344	.00192	
62,270	62,270	.....	.....	.....	.....	Ultimate strength.

Failed by triple flexure.

12-INCH B. L. RIFLED MORTARS.

TABULATION OF TENSION SPECIMENS FROM CAST-IRON BODIES.

No. of test.	Numbers.		Position in body.	Location of specimen.	Length of stem.	Sectional area.	Tensile strength per square inch.	Fracture.	Specific gravity.	Hardness.	Remarks.
	Mortar.	Specimen.			*Inches.*	*Sq. inch.*	*Pounds.*				
					24.25	1.00	28,010	Uniform granular			Condemned body.
3860	1	1	Breech		24.25	1.00	28,020	do			Do.
3861	1	2	do		22.88	1.00	30,020	do			Do.
3862	1	1	do		23.87	1.00	31,780	do			Do.
3863	1	2	do	Inside	Grooved	1.00	28,220	do	7.2525	15.20	Do.
3063	1	3	do	Outside	do	1.00	30,730	do			Do.
3064	1	4	do	Middle	do	1.00	29,010	do	7.2487	14.76	Do.
3065	1	5	do	Inside	do	1.00	31,840	do			Do.
3066	1	3	do	Outside	do	1.00	31,610	do			Do.
3067	1	4	do	Middle	do	1.00	33,430	do			Do.
3068	1	5	do	Inside	do	1.00	34,480	do	7.2539	14.98	Do.
3069	1	6	do	Outside	do	1.00	31,170	do	7.2384	15.75	Do.
3070	1	7	do	Middle	do	1.00	33,390	do	7.2570	16.90	Do.
3071	1	8	do								
3812	2	1	Muzzle		24.10	.99	31,150	do			
3813	2	2	do		24.06	1.00	30,020	do	7.2480	18.38	
3059	2	3	do	Inside	Grooved	1.00	32,710	do	7.2465	19.81	
3060	2	4	do	Outside	do	1.00	31,690	do	7.2370	18.19	
3061	2	5	do	Middle	do	1.00	32,480	do	7.2428	18.78	
3053	2	3	Breech	Inside	do	1.00	31,670	do	7.2465	17.26	
3054	2	4	do	Outside	do	1.00	32,580	do	7.2435	16.90	
3055	2	5	do	Middle	do	1.00	32,350	do	7.2441	17.44	
3056	2	6	do		do	1.00	33,240	do			
3057	2	7	do		do	1.00	31,980	do			
3058	2	8	do		do	1.00	31,340	do			
3810	2	1	do		24.56	1.00	29,010	do			
3811	2	2	do		24.43	1.00	29,210	do			
3826	3	1	Muzzle		23.75	1.00	29,140	do			
3827	3	2	do		23.62	1.00	30,520	do	7.2586	17.71	
3828	3	1	Breech		24 3/16	1.00	28,820	do			
3829	3	2	do		24 3/16	1.00	30,570	do			
3830	4	1	Muzzle			1.00	32,610	do			
3831	4	2	do			1.00	32,590	do			
3832	4	1	Breech			1.00	27,880	Granular, dark mottled			
3833	4	2	do			1.00	28,080	Granular, in part dark mottled			
3834	5	1	Muzzle		27 1/8	1.00	30,010	do			
3835	5	2	do		27 1/8	1.00	29,420	Granular, with dark spangles			
3836	5	1	Breech		27 1/8	1.00	28,890	Uniform granular			
3837	5	2	do		27 1/8	1.00	29,970	do			
3847	6	1	Muzzle		25 1/8	1.00	31,150	Granular, with dark spangles			

TABULATION OF TENSION SPECIMENS FROM CAST-IRON BODIES—Continued.

No. of test.	Numbers. Mortar.	Numbers. Specimen.	Position in body.	Location of specimen.	Length of stem.	Sectional area.	Tensile strength per square inch.	Fracture.	Specific gravity.	Hardness.	Remarks.
					Inches.	*Sq. inch.*	*Pounds.*				
3883	6	2	Muzzle			1.00	29,810	Granular, light-colored metal interspersed with dark spots.			
3848	6	2	Breech		23	1.00	25,850	Granular, in part dark mottled			
3843	7	1	Muzzle		23¾	1.00	31,380	Uniform granular			
3844	7	2	Breech		23¼	1.00	30,240	do			
3858	8	1	Muzzle	Middle	23	1.00	31,070	Granular, in part dark mottled	7.2781	17.17	
3859	8	2	Breech		23	1.00	28,300	Uniform granular			
3909	9	1	Muzzle			1.00	30,710	do	7.2811	17.08	
3910	9	1	Breech			1.00	31,960	do	7.2839	16.90	
3911	10	1	Muzzle		23	1.00	31,590	Granular	7.2866	18.48	
3912	10	2	Breech		23	1.00	29,880	do	7.2838	16.56	
3976	11	1	Muzzle		23	1.00	29,980	Granular, mottled			
3977	11	2	do		23	1.00	24,900	do			
3078	11	3	do	Inside	Grooved	1.00	39,180	do	7.3544	18.98	
3079	11	4	do	Outside	do	1.00	36,220	do	7.3520	17.62	
3080	11	5	do	Middle	do	1.00	32,470	do	7.3193	17.99	
3081	11	6	do	Inside	do	1.00	35,790	do			
3082	11	7	do	Outside	do	1.00	33,260	do			
3083	11	8	do	do	do	1.00	33,100	do	7.3185	16.56	
3913	11	1	Breech		23	1.00	32,290	Granular	7.3136	15.43	
3914	11	2	do		23	1.00	30,040	do			
3980	12	1	Muzzle		23	1.00	29,210	Uniform granular	7.2767	18.58	
3981	12	2	do		23	1.00	31,800	do			
3090	12	3	do	Inside	Grooved	1.00	33,580	do	7.2804	20.03	
3091	12	4	do	Outside	do	1.00	30,040	do	7.2736	18.58	
3092	12	5	do	Middle	do	1.00	33,100	do	7.2943	20.47	
3093	12	6	do	Inside	do	1.00	32,710	do			
3094	12	7	do	Outside	do	1.00	32,240	do			
3095	12	8	do	do	do	1.00	33,490	do			
3978	12	1	Breech		23	1.00	26,270	do	7.2810	15.43	
3979	12	2	do		23	1.00	27,360	do			
3084	12	3	do	Inside	Grooved	1.00	28,320	do			
3085	12	4	do	Outside	do	1.00	32,480	do			
[illegible]	12	5	do	Middle	do	1.00	29,910	do			
[illegible]	[illegible]	[illegible]	do	Inside	do	1.00	29,300	do	7.2832	15.75	
									7.2792	15.43	Upper end.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	do	1.00	29,490	do	7.2786	15.59	
									7.2806	16.23	Do.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.00	29,150	do	7.2755	15.91	
									7.2780	14.61	Do.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	do	7.2928	15.99	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	do			

TABULATION OF TENSION SPECIMENS FROM CAST-IRON BODIES—Continued.

No. of test.	Numbers. Mortar.	Numbers. Specimen.	Position in body.	Location of specimen.	Length of stem.	Sectional area.	Tensile strength per square inch.	Fracture.	Specific gravity.	Hardness.	Remarks.
					Inches.	*Sq. inch.*	*Pounds.*				
4395	17	7	Breech	Outside	Grooved	1.00	36,970		7.3124	15.13	
4396	17	8	do	Middle	do	1.00	34,930		7.2860	13.99	
4074	18	1	Muzzle		23	1.00	29,630	Granular mottled	7.2990	16.15	
4075	18	2	do		23	1.00	29,870	do			
4407	18	3	do	Inside	Grooved	1.00	33,990		7.2977	17.81	
4408	18	4	do	Outside	do	1.00	34,420		7.3183	16.31	
4409	18	5	do	Middle	do	1.00	32,600		7.3124	17.26	
4410	18	8	do	Outside	do	1.00	35,170				
4072	18	1	Breech		23	1.00	28,010	Medium fine granular with dark spot	7.2927	14.69	
4073	18	2	do		23	1.00	27,260	do			
4401	18	3	do	Inside	Grooved	1.00	35,280				
4402	18	4	do	Outside	do	1.00	35,010				
4403	18	5	do	Middle	do	1.00	31,440				
4404	18	6	do	Inside	do	1.00	36,020		7.2977	15.91	
4405	18	7	do	Outside	do	1.00	37,480		7.2865	15.20	
4406	18	8	do	Middle	do	1.00	37,350		7.2345	15.43	
4047	19	1	Muzzle		23	1.00	29,910	Medium coarse granular with dark spots	7.3160	15.75	
4048	19	2	do		23	1.00	29,620	do			
3122	19	3	do	Inside	Grooved	1.00	33,390		7.3219	16.56	
3123	19	4	do	Outside	do	1.00	31,610		7.3205	15.91	
3124	19	5	do	Middle	do	1.00	31,040		7.3276	16.56	
3125	19	8	do	Outside	do	1.00	33,800				
3092	19	1	Breech		23	1.00	25,510	Granular	7.3120	14.19	
3093	19	2	do		23	1.00	29,610	Uniform granular			
3119	19	3	do	Inside	Grooved	1.00	30,090				
3120	19	4	do	Outside	do	1.00	33,320				
3121	19	5	do	Middle	do	1.00	31,140				
3110	19	6	do	Inside	do	1.00	31,410		7.3215	14.69	
3111	19	7	do	Outside	do	1.00	32,040		7.3139	14.69	
3112	19	8	do	Middle	do	1.00	31,590		7.3224	15.13	
4078	20	2	Muzzle		23	1.00	29,080	Granular, mottled			
4418	20	3	do	Inside	Grooved	1.00	34,150		7.3191	17.17	
4419	20	4	do	Outside	do	1.00	31,700		7.3282	16.07	
4420	20	5	do	Middle	do	1.00	32,450		7.3324	16.90	
4421	20	6	do	Outside	do	1.00	33,720		7.3015	15.59	
4076	20	2	Breech		23	1.00	30,590	Uniform granular	7.3163	14.33	
[illegible]	20	11	do		10	1.00	31,410	do			
[illegible]	[illegible]	[illegible]	do	Inside	Grooved	1.00	32,510				
[illegible]	[illegible]	[illegible]	[illegible]	Outside	do	1.00	33,660				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	do	1.00	33,610				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.00	34,990		7.3191	15.43	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		7.3148	14.98	

									7.3237	15.36
4416	20	8	....do	Middle	....do	1.00	33,340			
4417	20	9	....do	....do	....do	1.00	31,970			
4084	21	2	Muzzle	....do	23	1.00	28,350	Uniform granular	7.3105	15.91
4429	21	3	....do	Inside	Grooved	1.00	33,610		7.3122	15.43
4430	21	4	....do	Outside	....do	1.00	31,520		7.3178	16.48
4431	21	5	....do	Middle	....do	1.00	31,700		7.3158	15.99
4432	21	6	....do	Outside	23	1.00	34,800		7.3128	14.33
4085	21	2	Breech		9.4	1.00	29,030	Uniform granular		
4086	21	11	....do	Inside	Grooved	1.00	31,280	....do		
4422	21	3	....do	Outside	....do	1.00	30,970			
4423	21	4	....do	Middle	....do	1.00	33,530			
4424	21	5	....do	Inside	....do	1.00	30,410			
4425	21	6	....do	Outside	....do	1.00	31,170		7.3136	13.85
4426	21	7	....do	Middle	....do	1.00	31,960		7.3124	14.69
4427	21	8	....do	....do	....do	1.00	31,590		7.3143	14.40
4428	21	9	....do			1.00	30,070			
4124	22	2	Muzzle		23	1.00	29,520	Granular, mottled		
4439	22	3	....do	Inside	Grooved	1.00	32,040		7.3235	17.44
4440	22	4	....do	Outside	....do	1.00	31,120		7.3278	16.73
4441	22	5	....do	Middle	....do	1.00	31,530		7.3326	17.26
4442	22	6	....do	Outside	....do	1.00	32,890		7.3279	15.59
4422	22	1	Breech		23	1.00	26,520	Uniform granular	7.3253	15.75
4423	22	2	....do		23	1.00	24,980	....do		
4433	22	3	....do	Inside	Grooved	1.00	30,820			
4434	22	4	....do	Outside	....do	1.00	33,640			
4435	22	5	....do	Middle	....do	1.00	30,690			
4436	22	6	....do	Inside	....do	1.00	30,790		7.3248	15.07
4137	22	7	....do	Outside	....do	1.00	31,510		7.3281	14.98
4438	22	8	....do	Middle	....do	1.00	30,500		7.3269	14.06
4152	23	2	Muzzle		23	1.00	30,480	Granular, mottled		
4450	23	3	....do	Inside	Grooved	1.00	33,470		7.3137	16.82
4451	23	4	....do	Outside	....do	1.00	29,210		7.3153	16.56
4452	23	5	....do	Middle	....do	1.00	32,640		7.3288	17.62
4453	23	6	....do	Outside	....do	1.00	32,390		7.3101	16.23
4125	23	2	Breech		23	1.00	26,140	Uniform granular		
4127	23	11	....do		9¼	1.00	30,713	....do		
4443	23	3	....do	Inside	Grooved	1.00	29,970			
4444	23	4	....do	Outside	....do	1.00	23,700		7.3074	14.90
4445	23	5	....do	Middle	....do	1.00	31,560			
4446	23	6	....do	Inside	....do	1.00	29,810		7.3121	14.90
4447	23	7	....do	Outside	....do	1.00	33,050		7.3127	14.76
4448	23	8	....do	Middle	....do	1.00	32,020		7.3136	15.05
4449	23	9	....do	....do	....do	1.00	30,040			
4160	24	2	Muzzle		23	1.00	29,580	Granular, with coarse dark spangles		
4454	24	3	....do	Inside	Grooved	1.00	32,980		7.3230	19.08
4455	24	4	....do	Outside	....do	1.00	32,960		7.3184	17.62
4456	24	5	....do	Middle	....do	1.00	32,210		7.3321	18.28
4457	24	6	....do	Outside	....do	1.00	34,270		7.3203	16.99
4161	24	1	Breech		23	1.00	29,030	Uniform granular		
4162	24	11	....do		15.75	1.00	29,990	....do		

TABULATION OF TENSION SPECIMENS FROM CAST-IRON BODIES—Continued.

No. of test.	Numbers. Mortar.	Numbers. Specimen.	Position in body.	Location of specimen.	Length of stem.	Sectional area.	Tensile strength per square inch.	Fracture.	Specific gravity.	Hardness.	Remarks.
					Inches.	*Sq. inch.*	*Pounds.*				
4458	24	3	Breech	Inside	Grooved	1.00	30,910	Uniform granular			
4459	24	4	do	Outside	do	1.00	32,990		7.3153	15.51	
4460	24	5	do	Middle	do	1.00	32,450				
4461	24	6	do	Inside	do	1.00	33,920		7.3160	15.51	
4462	24	7	do	Outside	do	1.00	31,030		7.3148	15.28	
4463	24	8	do	Middle	do	1.00	32,650		7.3183	15.33	
4165	25	2	Muzzle		23	1.00	28,480	Granular, mottled			
4470	25	3	do	Inside	Grooved	1.00	32,590		7.3094	16.56	
4471	25	4	do	Outside	do	1.00	30,740		7.3072	14.98	
4472	25	5	do	Middle	do	1.00	29,930		7.3093	15.20	
4473	25	6	do	Outside	do	1.00	33,470		7.3003	15.51	
4163	25	2	Breech		23	1.00	29,620	Uniform granular			
4164	25	11	do		11	1.00	32,410	do			
4464	25	3	do	Inside	Grooved	1.00	33,720				
4465	25	4	do	Outside	do	1.00	33,560		7.2991	15.28	
4466	25	5	do	Middle	do	1.00	34,130				
4467	25	6	do	Inside	do	1.00	33,890		7.3073	16.23	
4468	25	7	do	Outside	do	1.00	35,830		7.3104	16.23	
4469	25	8	do	Middle	do	1.00	37,600		7.3158	15.75	
4296	26	2	Muzzle		23	1.00	20,850	Granular, with coarse dark spangles			
4504	26	3	do	Inside	Grooved	1.00	29,520		7.2962	14.05	
4505	26	4	do	Outside	do	1.00	28,040		7.3054	14.12	
4506	26	5	do	Middle	do	1.00	29,050		7.3063	14.76	
4507	26	6	do	Outside	do	1.00	31,530		7.2995	13.72	
4297	26	1	Breech		23	1.00	27,980	Uniform granular			
4298	26	11	do		15.75	1.00	28,270	do			
4508	26	3	do	Inside	Grooved	1.00	29,810				
4509	26	4	do	Outside	do	1.00	33,400		7.3041	14.98	
4510	26	5	do	Middle	do	1.00	30,380				
4511	26	6	do	Inside	do	1.00	30,650		7.3067	14.76	
4512	26	7	do	Outside	do	1.00	29,970		7.3058	15.20	
4513	26	8	do	Middle	do	1.00	31,200		7.3082	15.13	
4299	27	2	Muzzle		23	1.00	26,940	Granular and dark mottled			
4524	27	3	do	Inside	Grooved	1.00	30,260		7.2994	14.33	
4525	27	4	do	Outside	do	1.00	29,980		7.2936	15.05	
4526	27	5	do	Middle	do	1.00	29,010		7.3015	15.20	
4527	27	6	do	Outside	do	1.00	31,170		7.2972	14.40	
		11	Breech		23	1.00	27,400	Uniform granular			
					15.75	1.00	27,030	do			
					Grooved	1.00	29,420				

TABULATION OF TENSION SPECIMENS FROM CAST-IRON BODIES—Continued.

No. of test.	Numbers.		Position in body.	Location of specimen.	Length of stem.	Sectional area.	Tensile strength per square inch.	Fracture.	Specific gravity.	Hardness.	Remarks.
	Mortar.	Specimen.									
					Inches.	*Sq.inch.*	*Pounds.*				
4295	31	11	Breech		15.75	1.00	32,210	Uniform granular			
4498	31	3	....do	Inside	Grooved	1.00	32,530				
4499	31	4	....do	Outside	....do	1.00	34,000		7.3352	14.47	
4500	31	5	....do	Middle	....do	1.00	35,620				
4501	31	6	....do	Inside	....do	1.00	35,840		7.3426	14.90	
4502	31	7	....do	Outside	....do	1.00	34,270		7.3390	15.20	
4503	31	8	....do	Middle	....do	1.00	37,310		7.3475	16.31	

TABULATION OF COMPRESSION SPECIMENS FROM CAST-IRON BODIES—Continued.

No. of test.	Numbers. Mortar.	Numbers. Specimen.	Position in body.	Location of specimen.	Total length.	Sectional area.	Ultimate strength per square inch.	Manner of failure.	Specific gravity.	Hardness.	Remarks.
					Inches.	*Sq. inch.*	*Pounds.*				
848	18	9	Breech		12.	1.00	50,480	Triple flexure			
849	18	10	do	Radial	10.	1.00	58,250	do			
841	19	9	Muzzle		12.	1.00	56,380	do			
839	19	9	Breech		12.	1.00	51,800	do			
840	19	10	do	Radial	10.	1.00	61,900	do			
851	20	1	Muzzle		12.	1.00	56,650	do			
852	20	1	Breech		12.	1.00	51,290	do	7.3083	15.91	
853	20	10	do	Radial	10.	1.00	61,020	do			
856	21	1	Muzzle		12.	1.00	55,900	do	7.3195	17.81	
854	21	1	Breech		12.	1.00	50,400	do	7.3183	14.69	
855	21	10	do	Radial	10.	1.00	60,980	do			
859	22	1	Muzzle		12.	1.00	57,160	do			
858	22	9	Breech		12.	1.00	52,250	do			
857	22	10	do	Radial	10.	1.00	62,540	do			
862	23	1	Muzzle		12.	1.00	57,940	do			
860	23	1	Breech		12.	1.00	52,300	do			
861	23	10	do	Radial	10.	1.00	61,460	do			
863	24	1	Muzzle		12.	1.00	58,560	do			
864	24	2	Breech		12.	1.00	54,190	do			
865	24	10	do	Radial	10.	1.00	64,580	do			
869	25	1	Muzzle		12.	1.00	51,290	do			
866	25	1	Breech		12.	1.00	52,150	do			
867	25	9	do		12.	1.00	51,520	do			
868	25	10	do	Radial	10.	1.00	60,650	do			
877	26	1	Muzzle		12.	1.00	51,100	do			
878	26	2	Breech		12.	1.00	53,050	do			
879	26	10	do	Radial	9.43	1.00	63,680	do			
885	27	1	Muzzle		12.	1.00	50,200	do			
886	27	2	Breech		12.	1.00	50,420	do			
887	27	10	do	Radial	8.31	1.00	70,040	do			
882	28	1	Muzzle		12.	1.00	51,960	do			
883	28	2	Breech		12.	1.00	52,100	do			
884	28	10	do	Radial	10.	1.00	61,040	do			
872	29	1	Muzzle		12.	1.00	51,450	do			
870	29	2	Breech		12.	1.00	53,060	do			
871	29	10	do	Radial	10.	1.00	62,500	do			
873	30	1	Muzzle		12.	1.00	50,780	do			
874	30	2	Breech		12.	1.00	52,700	do			
875	30	10	do	Radial	10.	1.00	61,050	do			
876	31	1	Muzzle		12.	1.00	51,720	do			
880	31	2	Breech		12.	1.00	52,900	do			
881	31	10	do	Radial	10.	1.00	62,270	do			

12-INCH B. L. MORTAR, NO. 1.

TRUNNION HOOP.

No. 3917.

Marks, $^{12\ M\ R_1\ T\ H}_{T_2\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Ganged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	0.	.....	
2,500	10,000	.000450	.000275	.....	.....	
5,000	20,000	.000800	.000350	.....	.....	
7,500	30,000	.001175	.000375	.....	.....	
10,000	40,000	.001500	.000325	.....	.....	
11,250	45,000	.001675	.000175	.000150	.000050	
12,000	48,000	.001750	.000075	.000075	.000025	
12,250	49,000	.001800	.000050	.....	.....	
12,500	50,000	.001875	.000075	.....	.....	
12,750	51,000	.001925	.000050	.....	.....	
13,000	52,000	.001975	.000050	.....	.....	Elastic limit.
13,250	53,000	.002075	.000100	.....	.....	
13,500	54,000	.002250	.000175	.....	.....	
13,750	55,000	.002400	.000150	.....	.....	
14,250	57,000	.002800	.000400	.....	.....	
14,750	59,000	.004000	.001200	.....	.....	
15,250	61,000	.005500	.001500	.....	.....	
15,750	63,000	.006750	.001250	.....	.....	
16,250	65,000	.007750	.001000	.....	.....	
25,360	101,440	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,440
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001975
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		2". from neck
Character of broken surface		granular, silky center
Elongation of inch sections		".10, ".31", ".15, ".12

12-INCH B. L. MORTAR, NO. 2.

TRUNNION HOOP.

No. 3814.

Marks, $\frac{12\,M\,R_2\,T\,H}{T_1\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	0.	.....	
2,500	10,000	.000300	.000125	.....	.....	
5,000	20,000	.000550	.000250	.....	.....	
7,500	30,000	.000925	.000375	.....	.....	
10,000	40,000	.001300	.000375	.....	.....	
11,250	45,000	.001450	.000150	0.	.....	
12,000	48,000	.001550	.000100	0.	.....	
12,250	49,000	.001575	.000025	.....	.....	
12,500	50,000	.001650	.000075	.....	.....	
12,750	51,000	.001700	.000050	.....	.....	
13,000	52,000	.001750	.000050	.....	.....	
13,250	53,000	.001800	.000050	.....	.....	Elastic limit.
13,500	54,000	.001950	.000150	.....	.....	
13,750	55,000	.002175	.000225	.....	.....	
14,000	56,000	.002500	.000325	.....	.....	
14,500	58,000	.003550	.001050	.....	.....	
15,000	60,000	.005000	.001450	.....	.....	
15,500	62,000	.006750	.001750	.....	.....	
16,000	64,000	.008250	.001500	.....	.....	
16,500	66,000	.009875	.001625	.....	.....	
25,360	101,440	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,440
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	0.1625
Elongation per inch under strain at elastic limit	do ...	.001800
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1" from neck
Character of broken surface		silky center, granular at circumference
Elongation of inch sections		".09, ".11, ".17, ".28

Hoop A_7.

No. 3928.

Marks, $\frac{12\ M\ R_2\ A_7}{T_4\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000650	.000350	.....	.....	
7,500	30,000	.001025	.000375	.....	.....	
10,000	40,000	.001375	.000350	.....	.....	
11,250	45,000	.001550	.000175	.000025	.000025	
12,500	50,000	.001775	.000225	.000050	.000025	
12,750	51,000	.001825	.000050	.....	.....	Elastic limit.
13,000	52,000	.002100	.000275	.....	.....	
13,250	53,000	.002250	.000150	.....	.....	
13,500	54,000	.002400	.000150	.....	.....	
14,000	56,000	.002575	.000175	.....	.....	
14,500	58,000	.003175	.000600	.....	.....	
15,000	60,000	.004125	.000950	.....	.....	
15,400	62,000	.005750	.001625	.....	.....	
15,800	64,000	.007000	.001250	.....	.....	
26,210	105,240	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,240
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	0.1275
Elongation per inch under strain at elastic limit	do...	.001825
Reduction in diameter at point of rupture		.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		2".25 from neck
Character of broken surface	granular;	dull spot at circumference
Elongation of inch sections		".18, ".16*, ".16*, ".11

No. 3929.

Marks, $^{12}\,{}^{M}_{T_2}\,R_1\,A_1$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000350	.000225	.....	.....	
5,000	20,000	.000725	.000375	.....	.....	
7,500	30,000	.001200	.000475	.....	.....	
10,000	40,000	.001475	.000275	.....	.....	
11,250	45,000	.001700	.000225	.000125	.000125	
12,500	50,000	.001975	.000275	.000250	.000125	Elastic limit (approximate).
12,750	51,000	.002050	.000075	.....	.....	
13,000	52,000	.002175	.000125	.....	.....	
13,250	53,000	.002300	.000125	.....	.....	
13,750	55,000	.002625	.000325	.....	.....	
14,250	57,000	.003300	.000675	.....	.....	
14,750	59,000	.004375	.001075	.....	.....	
15,250	61,000	.005900	.001525	.....	.....	
15,750	63,000	.007500	.001600	.....	.....	
25,640	102,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,560
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	0.1475
Elongation per inch under strain at elastic limit	do...	.001975
Reduction in diameter at point of rupture	do...	.064
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1".75 from neck
Character of broken surface	granular, 80 per cent.; dull silky, 20 per cent.	
Elongation of inch sections		".11, ".24*, ".13, ".11

HOOP B_3.

No. 3924.

Marks, $\frac{12\,M\,R_2\,B_3}{T_5\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000400	.000250	.....	.....	
5,000	20,000	.000675	.000275	.....	.....	
7,500	30,000	.001000	.000325	.....	.....	
10,000	40,000	.001350	.000350	.....	.....	
11,250	45,000	.001550	.000200	.000050	.000050	
12,500	50,000	.001750	.000200	.000050	0.	
12,750	51,000	.001800	.000050	.....	.....	
13,000	52,000	.001825	.000025	.....	.....	
13,250	53,000	.001900	.000075	.....	.....	
13,500	54,000	.001950	.000050	.....	.....	
13,750	55,000	.001975	.000025	.....	.....	
14,000	56,000	.002025	.000050	.....	.....	Elastic limit (not well defined).
14,250	57,000	.002150	.000125	.....	.....	
14,500	58,000	.002250	.000100	.....	.....	
14,750	59,000	.002350	.000100	.....	.....	
15,250	61,000	.002675	.000325	.....	.....	
15,750	63,000	.003450	.000775	.....	.....	
16,250	65,000	.004925	.001475	.....	.....	
16,750	67,000	.006700	.001775	.....	.....	
17,250	69,000	.008625	.001925	.....	.....	
26,320	105,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,280
Elastic limit per square inch of original section (not well defined)	do...	56,000
Elongation per inch after rupture	inch..	0.1650
Elongation per inch under strain at elastic limit	do...	.002025
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1″ from neck
Character of broken surface		granular, radiating from a point in the circumference
Elongation of inch sections		″.12, ″.17, ″.16, ″.21

No. 3925.

Marks, $^{12\ M\ R_1\ B_2}_{T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000650	.000350	.....	.....	
7,500	30,000	.001025	.000375	.....	.....	
10,000	40,000	.001375	.000350	.....	.....	
11,250	45,000	.001675	.000200	.000025	.000025	
12,500	50,000	.001825	.000250	.000075	.000050	
12,750	51,000	.001850	.000025	.....	.....	Elastic limit.
13,000	52,000	.001975	.000125	.....	.....	
13,250	53,000	.002075	.000100	.....	.....	
13,500	54,000	.002300	.000225	.....	.....	
14,000	56,000	.002925	.000600	.....	.....	
14,500	58,000	.004375	.000450	.....	.....	
15,000	60,000	.006125	.001750	.....	.....	
15,500	62,000	.007875	.001750	.....	.....	
16,000	64,000	.009375	.001500	.....	.....	
25,260	101,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,040
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	0.1525
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2".15 from neck.
Character of broken surface		granular; dull silky spot
Elongation of inch sections		".10, ".18, ".23*, ".10

Hoop B_6.

No. 3915.

Marks, $\frac{12\ M\ R_2\ B_6}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000200	.000200	0.	.....	
2,500	10,000	.000425	.000225	.....	.....	
5,000	20,000	.000700	.000275	.....	.....	
7,500	30,000	.001050	.000350	.....	.....	
10,000	40,000	.001425	.000375	.....	.....	
11,250	45,000	.001550	.000125	.000075	.000075	
12,500	50,000	.001775	.000225	.000075	0.	
12,750	51,000	.001800	.000025	.....	.....	
13,000	52,000	.001825	.000025	.....	.....	
13,250	53,000	.001875	.000050	.....	.....	
13,500	54,000	.001950	.000075	.....	.....	
13,750	55,000	.0020.5	.000075	.....	.....	
14,000	56,000	.002100	.000075	.....	.....	
14,250	57,000	.002200	.000100	.....	.....	Elastic limit.
14,500	58,000	.002375	.000175	.....	.....	
14,750	59,000	.002550	.000175	.....	.....	
15,000	60,000	.002875	.000325	.....	.....	
15,500	62,000	.004125	.001250	.....	.....	
16,000	64,000	.005750	.001625	.....	.....	
16,500	66,000	.007425	.001675	.....	.....	
17,000	68,000	.008950	.001525	.....	.....	
17,500	70,000	.010300	.001350	.....	.....	
26,610	106,440	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,440
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	0.1475
Elongation per inch under strain at elastic limit	do...	.002200
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		2″.50 from neck
Character of broken surface		granular; silky eccentric spot
Elongation of inch sections		″.10, ″.17, ″.23*, ″.09

GAS CHECK.

No. 3816.

Marks, $\frac{12\ M\ B\ G\ C}{T\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000200	.000100	.....	.....	
7,500	30,000	.000867	.000667	.....	.....	
12,500	50,000	.001600	.000733	.....	.....	
15,000	60,000	.001933	.000333	0.	.....	
17,500	70,000	.002300	.000367	0.	.....	
17,750	71,000	.002300	0.	.....	.....	
18,000	72,000	.002333	.000033	.....	.....	
18,250	73,000	.002333	0.	.....	.....	
18,500	74,000	.002367	.000034	.....	.....	
18,750	75,000	.002400	.000033	.....	.....	Elastic limit.
19,000	76,000	.002633	.000233	.....	.....	
19,250	77,000	.002833	.000200	.....	.....	
19,500	78,000	.002933	.000100	.....	.....	
20,000	80,000	.003500	.000567	.....	.....	
20,500	82,000	.004333	.000833	.....	.....	
21,000	84,000	.005500	.001167	.....	.....	
21,500	86,000	.007000	.001500	.....	.....	
22,000	88,000	.008600	.001600	.....	.....	
33,460	133,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,840
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	0.1209
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	0.064
Reduction in area after rupture, per centum of original section		21.4
Position of rupture		1″.25 from neck
Character of broken surface		granular; silky spot near the circumference
Elongation of inch sections		″.06, ″.18, ″.12

No. 3817.

Marks, $\frac{12\ M\ R_2\ G\ C}{T_4\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000333	.000166	.....	.....	
7,500	30,000	.000967	.000634	.....	.....	
12,500	50,000	.001600	.000633	.....	.....	
15,000	60,000	.001933	.000333	0.	.....	
17,500	70,000	.002500	.000567	.000200	.000200	Elastic limit.
17,750	71,000	.002633	.000133	.....	.....	
18,000	72,000	.002800	.000167	.....	.....	
18,250	73,000	.002967	.000167	.....	.....	
18,750	75,000	.003367	.000400	.....	.....	
19,250	77,000	.004167	.000800	.....	.....	
19,750	79,000	.005000	.000833	.....	.....	
20,250	81,000	.006033	.001033	.....	.....	
20,750	83,000	.007000	.000967	.....	.....	
32,420	129,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section.....pounds.. 129,6[redacted]
Elastic limit per square inch of original section.....do... 70,[redacted]
Elongation per inch after rupture.....inch.. 0.1[redacted]
Elongation per inch under strain at elastic limit.....do... .002[redacted]
Reduction in diameter at point of rupture.....do... .[redacted]
Reduction in area after rupture, per centum of original section..... 2[redacted]
Position of rupture.....".75 from n[redacted]
Character of broken surface.....granular, silky cen[redacted]
Elongation of inch sections.....".06, ".08, "[redacted]17

12-INCH B. L. MORTAR, NO. 3.

TRUNNION HOOP.

No. 3824.

Marks, $\frac{12\ M\ R_2\ T\ H}{T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000325	.000175	.....	.....	
5,000	20,000	.000675	.000350	.....	.....	
7,500	30,000	.001025	.000350	.....	.....	
10,000	40,000	.001375	.000350	.....	.....	
11,250	45,000	.001550	.000175	.000050	.000050	
12,000	48,000	.001725	.000175	.000075	.000025	
12,250	49,000	.001775	.000050	.....	.....	
12,500	50,000	.001800	.000025	.....	.....	
12,750	51,000	.001850	.000050	.....	.....	
13,000	52,000	.001925	.000075	.....	.....	
13,250	53,000	.002000	.000075	.....	.....	
13,500	54,000	.002075	.000075	.....	.....	Elastic limit.
13,750	55,000	.002200	.000125	.....	.....	
14,000	56,000	.002325	.000125	.....	.....	
14,250	57,000	.002475	.000150	.....	.....	
14,750	59,000	.002950	.000475	.....	.....	
15,250	61,000	.004175	.001225	.....	.....	
15,750	63,000	.005525	.001350	.....	.....	
16,250	65,000	.007050	.001525	.....	.....	
16,750	67,000	.008625	.001575	.....	.....	
26,260	105,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,040
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	0.1325
Elongation per inch under strain at elastic limit	do...	.002075
Reduction in diameter at point of rupture	do...	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		1".10 from neck
Character of broken surface		granular
Elongation of inch sections		".16", ".18, ".11, ".09

Hoop A_4.

No. 3926.

Marks, $\frac{12\,M\,R_3\,A_4}{T,\,O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation.	Successive elongation	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.	per inch.	per inch.			
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.		
2,500	10,000	.000300	.000150			
5,000	20,000	.000650	.000350			
7,500	30,000	.001000	.000350			
10,000	40,000	.001400	.000400			
11,250	45,000	.001525	.000125	0.		
12,500	50,000	.001700	.000175	0.		
12,750	51,000	.001750	.000050			
13,000	52,000	.001775	.000025			
13,250	53,000	.001825	.000050			
13,500	54,000	.001875	.000050			
13,750	55,000	.001925	.000050			
14,000	56,000	.001975	.000050			
14,250	57,000	.002025	.000050			Elastic limit.
14,500	58,000	.002150	.000125			
14,750	59,000	.002275	.000125			
15,000	60,000	.002525	.000250			
15,500	62,000	.003150	.000625			
16,000	64,000	.003950	.000800			
16,500	66,000	.005100	.001150			
17,000	68,000	.006450	.001350			
17,500	70,000	.007925	.001475			
27,800	111,200					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,200
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	0.1375
Elongation per inch under strain at elastic limit	do...	.002025
Reduction in diameter at point of rupture	do...	.034
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1". 10 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		". 07, ". 08, ". 16, ". 20

Hoop A_5.

No. 3857.

Marks, $\frac{12\ M\ R_5\ A_5}{T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000050	.000050	0.	.....	
2,500	10,000	.000175	.000025	.....	.....	
5,000	20,000	.000525	.000350	.....	.....	
7,500	30,000	.000875	.000350	.....	.....	
10,000	40,000	.001250	.000375	.....	.....	
11,250	45,000	.001400	.000150	0.	.....	
12,500	50,000	.001575	.000175	0.	.....	
12,750	51,000	.001600	.000025	.....	.....	
13,000	52,000	.001625	.000025	.....	.....	
12,250	53,000	.001650	.000025	.....	.....	
13,500	54,000	.001725	.000075	.....	.....	
13,750	55,000	.001775	.000050	.....	.....	
14,000	56,000	.001800	.000025	.....	.....	
14,250	57,000	.001825	.000025	.....	.....	
14,500	58,000	.001875	.000050	.....	.....	
14,750	59,000	.001950	.000075	.....	.....	
15,000	60,000	.002000	.000050	.....	.....	Elastic limit.
15,250	61,000	.002100	.000100	.....	.....	
15,500	62,000	.002250	.000150	.....	.....	
15,750	63,000	.002625	.000375	.....	.....	
16,250	65,000	.003375	.000750	.....	.....	
16,750	67,000	.005875	.002500	.....	.....	
17,250	69,000	.007875	.002000	.....	.....	
17,750	71,000	.009750	.001875	.....	.....	
18,250	73,000	.001625	.001875	.....	.....	
26,510	106,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,040
Elastic limit per square inch of original section	do...	60,000
Elongation per inch after rupture	inch..	0.1725
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		2".20 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".09, ".22, ".28, ".10

Hoop B_1.

No. 3840.

Marks, $\frac{12\ M\ B_2\ B_1}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000650	.000350	.....	.....	
7,500	30,000	.001000	.000350	.....	.....	
10,000	40,000	.001375	.000375	.....	.....	
11,250	45,000	.001525	.000150	0.	.....	
12,500	50,000	.001750	.000225	0.	.....	
12,750	51,000	.001800	.000050	.....	.....	
13,000	52,000	.001825	.000025	.....	.....	
13,250	53,000	.001850	.000025	.....	.....	
13,500	54,000	.001900	.000050	.....	.....	
13,750	55,000	.001900	0.	.....	.....	
14,000	56,000	.002000	.000100	.....	.....	
14,250	57,000	.002025	.000025	.....	.....	Elastic limit.
14,500	58,000	.002150	.000125	.....	.....	
14,750	59,000	.002250	.000100	.....	.....	
15,000	60,000	.002350	.000100	.....	.....	
15,500	62,000	.002625	.000275	.....	.....	
16,000	64,000	.003200	.000575	.....	.....	
16,500	66,000	.004950	.001750	.....	.....	
17,000	68,000	.006750	.001800	.....	.....	
17,500	70,000	.008525	.001775	.....	.....	
27,040	108,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,160
Elastic limit per square inch of original section	do ..	57,000
Elongation per inch after rupture	inch..	0.1575
Elongation per inch under strain at elastic limit	do...	.002025
Reduction in diameter at point of rupture	do...	0.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2" from neck
Character of broken surface	granular at circumference 60 per cent.; silky center	
Elongation of inch sections		".16, ".28*, ".14, ".11

Hoop B_3

No. 3927.

Marks, $\frac{12\ M\ B_3\ B_3}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000575	.000300	.....	.....	
7,500	30,000	.000975	.000400	.....	.....	
10,000	40,000	.001275	.000300	.....	.....	
11,250	45,000	.001450	.000175	0.	.....	
12,500	50,000	.001700	.000250	0.	.....	
12,750	51,000	.001725	.000025	.....	.....	
13,000	52,000	.001750	.000025	.....	.....	
13,250	53,000	.001825	.000075	.....	.....	Elastic limit.
13,500	54,000	.001975	.000150	.....	.....	
13,750	55,000	.002125	.000150	.....	.....	
14,000	56,000	.002300	.000175	.....	.....	
14,500	58,000	.002850	.000550	.....	.....	
15,000	60,000	.003875	.001025	.....	.....	
15,500	62,000	.005175	.001300	.....	.....	
16,000	64,000	.006525	.000350	.....	.....	
16,500	66,000	.008000	.001475	.....	.....	
27,090	108,360	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,360
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	0.1500
Elongation per inch under strain at elastic limit	do...	.001825
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1″.30 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		″.17, ″.22*, ″.11, ″.10

12-INCH B. L. MORTAR, NO. 4.

HOOP A$_3$.

No. 3876.

Marks, $\frac{12\ M\ R_3\ A_3}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000250	.000125	.....	.....	
5,000	20,000	.000525	.000275	.....	.....	
7,500	30,000	.000825	.000300	.....	.....	
10,000	40,000	.001125	.000300	.....	.....	
11,250	45,000	.001325	.000200	0.	.....	
12,500	50,000	.001525	.000200	0.	.....	
12,750	51,000	.001550	.000025	.....	.....	
13,000	52,000	.001575	.000025	.....	.....	
13,250	53,000	.001625	.000050	.....	.....	
13,500	54,000	.001675	.000050	.....	.....	
13,750	55,000	.001725	.000050	.....	.....	
14,000	56,000	.001775	.000050	.....	.....	
14,250	57,000	.001825	.000050	.....	.....	
14,500	58,000	.001875	.000050	.....	.....	
14,750	59,000	.001925	.000050	.....	.....	Elastic limit.
15,000	60,000	.002050	.000125	.....	.....	
15,250	61,000	.002175	.000125	.....	.....	
15,500	62,000	.002450	.000275	.....	.....	
16,000	64,000	.003625	.001175	.....	.....	
16,500	66,000	.005075	.001450	.....	.....	
17,000	68,000	.007000	.001925	.....	.....	
17,500	70,000	.008625	.001625	.....	.....	
18,000	72,000	.010250	.001625	.....	.....	
26,980	107,920	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,920
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	0.1400
Elongation per inch under strain at elastic limit	do...	.001925
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1".50 from neck.
Character of broken surface		granular, dull silky center
Elongation of inch sections		".09, ".12, ".23*, ".12

Hoop A_4.

No. 3879.

Marks, $\frac{12\ M\ R_4\ A_4}{T.\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000350	.000225	.....	.....	
5,000	20,000	.000750	.000400	.....	.....	
7,500	30,000	.001100	.000350	.....	.....	
10,000	40,000	.001450	.000350	.....	.....	
11,250	45,000	.001600	.000150	.000075	.000075	
12,500	50,000	.001775	.000175	.000075	0.	
12,750	51,000	.001800	.000025	.....	.....	
13,000	52,000	.001850	.000050	.....	.....	
13,250	53,000	.001900	.000050	.....	.....	
13,500	54,000	.001925	.000025	.....	.....	
13,750	55,000	.001975	.000050	.....	.....	
14,000	56,000	.002050	.000075	.....	.....	
14,250	57,000	.002125	.000075	.....	.....	
14,500	58,000	.002200	.000075	.....	.....	
14,750	59,000	.002250	.000050	.....	.....	Elastic limit.
15,000	60,000	.002450	.000200	.....	.....	
15,250	61,000	.002650	.000200	.....	.....	
15,500	62,000	.003150	.000500	.....	.....	
16,000	64,000	.004250	.001100	.....	.....	
16,500	66,000	.006100	.001850	.....	.....	
17,000	68,000	.008025	.001925	.....	.....	
17,500	70,000	.009750	.001725	.....	.....	
18,000	72,000	.011250	.001500	.....	.....	
26,890	107,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,560
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	0.1550
Elongation per inch under strain at elastic limit	do...	.002250
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2" from neck
Character of broken surface		granular, silky center
Elongation of inch sections		".09, ".28*, ".15, ".10

HOOP B_4.

No. 3882.

Marks, $\frac{12\ M\ R_4\ B_4}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000200	.000125	.....	.....	
5,000	20,000	.000500	.000300	.....	.....	
7,500	30,000	.000850	.000350	.....	.....	
10,000	40,000	.001200	.000350	.....	.....	
11,250	45,000	.001325	.000125	0.	.....	
12,500	50,000	.001500	.000175	0.	.....	
12,750	51,000	.001550	.000050	.....	.....	
13,000	52,000	.001600	.000050	.....	.....	
13,250	53,000	.001650	.000050	.....	.....	
13,500	54,000	.001700	.000050	.....	.....	
13,750	55,000	.001750	.000050	.....	.....	
14,000	56,000	.001825	.000075	.....	.....	
14,250	57,000	.001900	.000075	.....	.....	Elastic limit.
14,500	58,000	.002025	.000125	.....	.....	
14,750	59,000	.002150	.000125	.....	.....	
15,000	60,000	.002450	.000300	.....	.....	
15,500	62,000	.003700	.001250	.....	.....	
16,000	64,000	.005400	.001700	.....	.....	
16,500	66,000	.007375	.001975	.....	.....	
17,000	68,000	.008875	.001500	.....	.....	
17,500	70,000	.010625	.001750	.....	.....	
25,980	103,920	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,920
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	0.1725
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	0.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		".15 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".10, ".30", ".18, ".11

Hoop B_5.

No. 3877.

Marks, $^{12}\frac{M}{T,O}\ R_4\ B_5$
Diameter ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000250	.000175	.....	.....	
5,000	20,000	.000575	.000325	.....	.....	
7,500	30,000	.000900	.000325	.....	.....	
10,000	40,000	.001225	.000325	.....	.....	
11,250	45,000	.001400	.000175	.000050	.000050	
12,500	50,000	.001575	.000175	.000050	0.	
12,750	51,000	.001600	.000025	.....	.....	
13,000	52,000	.001650	.000050	.....	.....	
13,250	53,000	.001675	.000025	.....	.....	
13,500	54,000	.001700	.000025	.....	.....	
13,750	55,000	.001725	.000025	.....	.....	
14,000	56,000	.001775	.000050	.....	.....	
14,250	57,000	.001825	.000050	.....	.....	
14,500	58,000	.001825	0.	.....	.....	
14,750	59,000	.001875	.000050	.....	.....	
15,000	60,000	.001925	.000050	.....	.....	
15,250	61,000	.002000	.000075	.....	.....	Elastic limit.
15,500	62,000	.002125	.000125	.....	.....	
15,750	63,000	.002250	.000125	.....	.....	
16,000	64,000	.002500	.000250	.....	.....	
16,500	66,000	.003500	.001000	.....	.....	
17,000	68,000	.005375	.001875	.....	.....	
17,500	70,000	.007325	.001950	.....	.....	
18,000	72,000	.009000	.001675	.....	.....	
18,500	74,000	.010750	.001750	.....	.....	
27,190	108,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,760
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.1525
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		2" from neck
Character of broken surface		granular; silky center
Elongation of inch sections		".08, ".14, ".27", ".37

TRUNNION HOOP.

No. 3875.

Marks, $\frac{12\ M\ R.\ T\ H}{T.\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000225	.000150	.....	.....	
5,000	20,000	.000575	.000350	.....	.....	
7,500	30,000	.000975	.000400	.....	.....	
10,000	40,000	.001225	.000250	.....	.....	
11,250	45,000	.001350	.000125	0.	.....	
12,000	48,000	.001475	.000125	0.	.....	
12,500	50,000	.001575	.000100	.....	.....	
12,750	51,000	.001600	.000025	.....	.....	
13,000	52,000	.001625	.000025	.....	.....	
13,250	53,000	.001675	.000050	.....	.....	
13,500	54,000	.001700	.000025	.....	.....	
13,750	55,000	.001725	.000025	.....	.....	
14,000	56,000	.001800	.000075	.....	.....	
14,250	57,000	.001825	.000025	.....	.....	
14,500	58,000	.001875	.000050	.....	.....	Elastic limit not well defined.
14,750	59,000	.001975	.000100	.....	.....	
15,000	60,000	.002050	.000075	.....	.....	
15,250	61,000	.002150	.000100	.....	.....	
15,500	62,000	.002375	.000225	.....	.....	
16,000	64,000	.003400	.001025	.....	.....	
16,500	66,000	.005300	.001900	.....	.....	
17,000	68,000	.006825	.001525	.....	.....	
17,500	70,000	.008825	.002000	.....	.....	
18,000	72,000	.010700	.001875	.....	.....	
26,580	106,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,320
Elastic limit per square inch of original section, not well defined	do...	58,000
Elongation per inch after rupture	inch..	0.1320
Elongation per inch under strain at elastic limit	do...	.001875
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		32.5
Position of rupture		2".20 from neck
Character of broken surface		granular; silky center.
Elongation of inch sections		".08, ".15, " 27", ".11

GAS CHECK.

No. 3880.

Marks, $^{12\ M\ R,\ G\ C}_{T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000367	.000200	.....	.....	
7,500	30,000	.001033	.000666	.....	.....	
12,500	50,000	.001733	.000700	.....	.....	
15,000	60,000	.002067	.000334	.000067	.000067	
17,500	70,000	.002500	.000433	.000133	.000066	
17,750	71,000	.002567	.000067	.....	.....	
18,000	72,000	.002600	.000033	.....	.....	
18,250	73,000	.002633	.000033	.....	.....	
18,500	74,000	.002700	.000067	.....	.....	
18,750	75,000	.002767	.000067	.....	.....	Elastic limit not well defined.
19,000	76,000	.002867	.000100	.....	.....	
19,250	77,000	.002967	.000100	.....	.....	
19,500	78,000	.003100	.000133	.....	.....	
19,750	79,000	.003233	.000133	.....	.....	
20,000	80,000	.003433	.000200	.....	.....	
20,250	81,000	.003567	.000134	.....	.....	
20,500	82,000	.003800	.000233	.....	.....	
20,750	83,000	.004133	.000333	.....	.....	
21,000	84,000	.004400	.000267	.....	.....	
21,500	86,000	.005100	.000700	.....	.....	
22,000	88,000	.006133	.001033	.....	.....	
22,500	90,000	.007200	.001067	.....	.....	
34,520	138,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	138,080
Elastic limit per square inch of original section, not well defined	do...	75,000
Elongation per inch after rupture	inch..	.1233
Elongation per inch under strain at elastic limit	do...	.002767
Reduction in diameter at point of rupture	do...	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		".75 from neck
Character of broken surface		granular; dull spot at the circumference
Elongation of inch sections		".14*, ".07, ".06

No. 3881.

Marks, $\frac{12\ M\ R_4\ G\ C}{T_6\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
7,500	30,000	.001000	.000667	.....	.....	
12,500	50,000	.001767	.000767	.....	.....	
15,000	60,000	.002067	.000300	.000067	.000067	Elastic limit below 70,000 pounds per square inch.
17,500	70,000	.002900	.000833	.000400	.000333	
17,750	71,000	.003067	.000167	.....	.....	
18,000	72,000	.003233	.000166	.....	.....	
18,250	73,000	.003467	.000234	.....	.....	
18,500	74,000	.003700	.000233	.....	.....	
19,000	76,000	.004467	.000767	.....	.....	
19,500	78,000	.005333	.000866	.....	.....	
20,000	80,000	.006333	.001000	.....	.....	
20,500	82,000	.007233	.000900	.....	.....	
21,000	84,000	.008500	.001267	.....	.....	
33,020	132,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	132,080
Elongation per inch after rupture	inch..	.0933
Reduction in diameter at point of rupture	do...	.054
Reduction in area after rupture, per centum of original section		18.3
Position of rupture		1″.50 from neck
Character of broken surface	granular; dull spot at the circumference	
Elongation of inch sections		″.06, ″.15, ″.07

12-INCH B. L. MORTAR, NO. 5.

HOOP A_4.

No. 3899.

Marks, $\frac{12\ M\ R_5\ A_4}{T_3\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000250	.000100	.....	.....	
5,000	20,000	.000625	.000375	.....	.....	
7,500	30,000	.000925	.000300	.....	.....	
10,000	40,000	.001250	.000325	.....	.....	
11,250	45,000	.001425	.000175	0.	.....	
12,500	50,000	.001625	.000200	0.	.....	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001675	.000025	.....	.....	
13,250	53,000	.001700	.000025	.....	.....	
13,500	54,000	.001725	.000025	.....	.....	Elastic limit.
13,750	55,000	.001850	.000025	.....	.....	
14,000	56,000	.001975	.000125	.....	.....	
14,250	57,000	.002200	.000225	.....	.....	
14,750	59,000	.002675	.000475	.....	.....	
15,250	61,000	.004250	.001575	.....	.....	
15,750	63,000	.006450	.002200	.....	.....	
16,250	65,000	.008625	.002175	.....	.....	
16,750	67,000	.010500	.001875	.....	.....	
24,880	99,520	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,520
Elastic limit per square inch of original section	do....	54,000
Elongation per inch after rupture	inch..	.1650
Elongation per inch under strain at elastic limit	do....	.001725
Reduction in diameter at point of rupture	do....	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1". 85 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		".08, ".14, ".33", ".1

HOOP A.

No. 3975.

Marks, $\frac{12\ M\ R_2\ A_6}{T_1\ O}$
Diameter, $''.564$.
Sectional area, .25 square inch.
Gauged length, $4''$.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	—.000050	—.000050	
2,500	10,000	.000175	.000050	.....	.....	
5,000	20,000	.000450	.000275	.....	.....	
7,500	30,000	.000775	.000325	.....	.....	
10,000	40,000	.001075	.000300	.....	.....	
11,250	45,000	.001275	.000200	—.000075	—.000025	
12,500	50,000	.001500	.000225	—.000075	0.	
12,750	51,000	.001550	.000050	.....	.....	
13,000	52,000	.001575	.000025	.....	.....	
13,250	53,000	.001600	.000025	.....	.....	
13,500	54,000	.001650	.000050	.....	.....	
13,750	55,000	.001700	.000050	.....	.....	
14,000	56,000	.001775	.000075	.....	.....	
14,250	57,000	.001800	.000025	.....	.....	Elastic limit.
14,500	58,000	.001900	.000100	.....	.....	
14,750	59,000	.002000	.000100	.....	.....	
15,000	60,000	.002175	.000175	.....	.....	
15,500	62,000	.003375	.001200	.....	.....	
16,000	64,000	.005000	.001625	.....	.....	
16,500	66,000	.007375	.002375	.....	.....	
17,000	68,000	.009200	.001825	.....	.....	
17,500	70,000	.011375	.002175	.....	.....	
25,290	101,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,160
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	0.1625
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.196
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1".50 from neck
Character of broken surface		silky, in part interspersed with granular metal
Elongation of inch sections		".14, ".32", ".18, ".69

Hoop B_5.

No. 3923.

Marks, $\frac{12\ M\ R_5\ B_5}{T_1\ O.}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000675	.000375	.....	.....	
7,500	30,000	.001000	.000325	.....	.....	
10,000	40,000	.001375	.000375	.....	.....	
11,250	45,000	.001525	.000150	.000025	.000025	
12,500	50,000	.001700	.000175	.000025	0.	
12,750	51,000	.001750	.000050	.....	.....	
13,000	52,000	.001775	.000025	.....	.....	
13,250	53,000	.001825	.000050	.....	.....	
13,500	54,000	.001850	.000025	.....	.....	
13,750	55,000	.001900	.000050	.....	.....	
14,000	56,000	.001925	.000025	.....	.....	
14,250	57,000	.001975	.000050	.....	.....	
14,500	58,000	.002025	.000050	.....	.....	Elastic limit.
14,750	59,000	.002125	.000100	.....	.....	
15,000	60,000	.002225	.000100	.....	.....	
15,250	61,000	.002350	.000125	.....	.....	
15,750	63,000	.002825	.000475	.....	.....	
16,250	65,000	.004375	.001550	.....	.....	
16,750	67,000	.005750	.001375	.....	.....	
17,250	69,000	.007450	.001700	.....	.....	
17,750	71,000	.009500	.002050	.....	.....	
27,070	108,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,280
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.17
Elongation per inch under strain at elastic limit	do...	.002025
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.70 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		″.13, ″.31*, ″.14, ″.10

12-INCH B. L. RIFLED MORTARS.

TRUNNION HOOP.

No. 3923.

Marks, $\frac{12\ M\ R_2\ T\ H}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000600	.000300	.....	.....	
7,500	30,000	.000925	.000325	.....	.....	
10,000	40,000	.001300	.000375	.....	.....	
11,250	45,000	.001425	.000125	0.	.....	
12,000	48,000	.001550	.000125	0.	.....	
12,250	49,000	.001575	.000025	.....	.....	
12,500	50,000	.001600	.000025	.....	.....	
12,750	51,000	.001650	.000050	.....	.....	
13,000	52,000	.001700	.000050	.....	.....	
13,250	53,000	.001750	.000050	.....	.....	
13,500	54,000	.001800	.000050	.....	.....	
13,750	55,000	.001850	.000050	.....	.....	Elastic limit.
14,000	56,000	.001950	.000100	.....	.....	
14,250	57,000	.002100	.000150	.....	.....	
14,500	58,000	.002275	.000175	.....	.....	
15,000	60,000	.003100	.000825	.....	.....	
15,500	62,000	.005000	.001900	.....	.....	
16,000	64,000	.007250	.002250	.....	.....	
16,500	66,000	.009350	.002100	.....	.....	
17,000	68,000	.010750	.001400	.....	.....	
24,980	99,920	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds...	99,920
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.1725
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1″.70 from neck
Character of broken surface		silky, in part interspersed with granular metal

HOOP B_4.

No. 3916.

Marks, $^{12\ M\ R_3\ B_4}_{T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000175	.000175	0.	.....	
2,500	10,000	.000450	.000275	.....	.....	
5,000	20,000	.000750	.000300	.....	.....	
7,500	30,000	.001175	.000425	.....	.....	
10,000	40,000	.001525	.000350	.....	.....	
11,250	45,000	.001700	.000175	.000050	.000050	
12,500	50,000	.001800	.000100	.000050	0.	
12,750	51,000	.001850	.000050	.....	.....	
13,000	52,000	.001900	.000050	.....	.....	
13,250	53,000	.001950	.000050	.....	.....	
13,500	54,000	.001975	.000025	.....	.....	
13,750	55,000	.002025	.000050	.....	.....	
14,000	56,000	.002050	.000025	.....	.....	
14,250	57,000	.002100	.000050	.....	.....	
14,500	58,000	.002150	.000050	.....	.....	
14,750	59,000	.002225	.000075	.....	.....	
15,000	60,000	.002300	.000075	.....	.....	Elastic limit.
15,250	61,000	.002450	.000150	.....	.....	
15,500	62,000	.003000	.000550	.....	.....	
15,750	63,000	.003425	.000425	.....	.....	
16,250	65,000	.005500	.002075	.....	.....	
16,750	67,000	.007875	.002375	.....	.....	
17,250	69,000	.009750	.001875	.....	.....	
17,750	71,000	.011500	.001750	.....	.....	
18,250	73,000	.013750	.002250	.....	.....	
26,070	104,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section ..... pounds.. 104,280
Elastic limit per square inch of original section ..... do... 60,000
Elongation per inch after rupture ..... inch.. .18
Elongation per inch under strain at elastic limit ..... do... .002300
Reduction in diameter at point of rupture ..... do... .12
Reduction in area after rupture, per centum of original section ..... 30.
Position of rupture ..... 2" from nec
Character of broken surface ..... silky; interspersed with granular met
Elongation of inch sections ..... ".10, ".17, ".35, "

GAS CHECK.

No. 3841.

Marks, $^{12\ M\ R_2\ G\ C}_{T_2\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000167	.000100	.....	.....	
7,500	30,000	.000800	.000633	.....	.....	
12,500	50,000	.001467	.000667	.....	.....	
15,000	60,000	.001800	.000333	0.	.....	
17,500	70,000	.002267	.000467	0.	.....	
17,750	71,000	.002367	.000100	.....	.....	
18,000	72,000	.002367	0.	.....	.....	
18,250	73,000	.002400	.000033	.....	.....	
18,500	74,000	.002467	.000067	.....	.....	
18,750	75,000	.002567	.000100	.....	.....	
19,000	76,000	.002667	.000100	.....	.....	Elastic limit not well defined.
19,250	77,000	.002800	.000133	.....	.....	
19,500	78,000	.003033	.000233	.....	.....	
19,750	79,000	.003367	.000334	.....	.....	
20,250	81,000	.004067	.000700	.....	.....	
20,750	83,000	.005000	.000933	.....	.....	
21,250	85,000	.006133	.001133	.....	.....	
21,750	87,000	.007333	.001200	.....	.....	
22,250	89,000	.008333	.001000	.....	.....	
33,200	132,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	132,800
Elastic limit per square inch of original section, not well defined	do...	76,000
Elongation per inch after rupture	inch..	0.1333
Elongation per inch under strain at elastic limit	do...	.002667
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		at middle of stem
Character of broken surface		granular, dull spot at the circumference
Elongation of inch sections		″.09, ″.22″, ″.09

No. 3842.

Marks, $^{12\ M\ R_6\ G\ C}_{T_4\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000200	.000133	.....	.....	
7,500	30,000	.000867	.000667	.....	.....	
12,500	50,000	.001567	.000700	.....	.....	
15,000	60,000	.001867	.000300	0.	.....	
17,500	70,000	.003100	.001233	.000567	.000567	Elastic limit below 70,000 pounds per inch.
17,750	71,000	.003467	.000367	.....	.....	
18,000	72,000	.003767	.000300	.....	.....	
18,250	73,000	.004167	.000400	.....	.....	
18,750	75,000	.005167	.001000	.....	.....	
19,250	77,000	.006333	.001166	.....	.....	
19,750	79,000	.007400	.001067	.....	.....	
20,250	81,000	.008500	.001100	.....	.....	
20,750	83,000	.010000	.001500	.....	.....	
31,610	126,440			.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	126,440
Elongation per inch after rupture	inch..	0.1300
Reduction in diameter at point of rupture	do...	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		".90 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		".18, ".11, ".10

12-INCH B. L. MORTAR, NO. 7.

HOOP A_6.

No. 4040.

Marks, $\frac{12\ M\ B,\ A_6}{T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000325	.000200	.....	.....	
5,000	20,000	.000700	.000375	.....	.....	
7,500	30,000	.001025	.000325	.....	.....	
10,000	40,000	.001400	.000375	.....	.....	
11,250	45,000	.001550	.000150	0.	.....	
12,500	50,000	.001725	.000175	0.	.....	
12,750	51,000	.001775	.000050	.....	.....	
13,000	52,000	.001800	.000025	.....	.....	
13,250	53,000	.001825	.000025	.....	.....	
13,500	54,000	.001900	.000075	.....	.....	
13,750	55,000	.001950	.000050	.....	.....	
14,000	56,000	.002000	.000050	.....	.....	
14,250	57,000	.002025	.000025	.....	.....	
14,500	58,000	.002100	.000075	.....	.....	
14,750	59,000	.002175	.000075	.....	.....	
15,000	60,000	.002250	.000075	.....	.....	Elastic limit.
15,250	61,000	.002375	.000125	.....	.....	
15,500	62,000	.002525	.000150	.....	.....	
15,750	63,000	.002725	.000200	.....	.....	
16,250	65,000	.003750	.001025	.....	.....	
16,750	67,000	.005625	.001875	.....	.....	
17,250	69,000	.007250	.001625	.....	.....	
17,750	71,000	.009250	.002000	.....	.....	
18,250	73,000	.011000	.001750	.....	.....	
27,200	109,160	.....	.....	.....	.....	Tensile strength.

General summary.

Specific gravity		7.8425
Hardness		22.77
Tensile strength per square inch of original section	pounds	109,160
Elastic limit per square inch of original section	do	60,000
Elongation per inch after rupture	inch	.1600
Elongation per inch under strain at elastic limit	do	.002250
Reduction in diameter at point of rupture	do	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		1".50 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		".09, ".14, ".28*, ".13

Hoop B_3.

No. 4076.

Marks, $^{12\,M\,R_2\,B_3}_{T_1\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000625	.000350	.....	.....	
7,500	30,000	.000950	.000325	.....	.....	
10,000	40,000	.001275	.000325	.....	.....	
11,250	45,000	.001450	.000175	0.	.....	
12,500	50,000	.001625	.000175	.....	.....	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001700	.000050	.....	.....	
13,250	53,000	.001725	.000025	.....	.....	
13,500	54,000	.001750	.000025	.....	.....	
13,750	55,000	.001775	.000025	.....	.....	
14,000	56,000	.001800	.000025	.....	.....	
14,250	57,000	.001850	.000050	.....	.....	
14,500	58,000	.001900	.000050	.....	.....	
14,750	59,000	.001950	.000050	.....	.....	
15,000	60,000	.002000	.000050	.....	.....	
15,250	61,000	.002025	.000025	.....	.....	
15,500	62,000	.002075	.000050	.....	.....	
15,750	63,000	.002125	.000050	.....	.....	Elastic limit.
16,000	64,000	.002275	.000150	.....	.....	
16,250	65,000	.002400	.000125	.....	.....	
16,500	66,000	.002575	.000175	.....	.....	
17,000	68,000	.003625	.001050	.....	.....	
17,500	70,000	.005500	.001875	.....	.....	
18,000	72,000	.007500	.002000	.....	.....	
18,500	74,000	.009500	.002000	.....	.....	
19,000	76,000	.011200	.001700	.....	.....	
27,590	110,360	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,360
Elastic limit per square inch of original section	do...	63,000
Elongation per inch after rupture	inch..	.1375
Elongation per inch under strain at elastic limit	do...	.002125
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1″.15 from neck
Character of broken surface		granular dull spot at circumference
Elongation of inch sections		″.17*, ″.18, ″.11, ″.09

Hoop B_5.

No. 4147.

Marks, $\frac{12\ M\ R_5\ B_5}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000160	.000100	0.	.....	
2,500	10,000	.000225	.000125	.....	.....	
5,000	20,000	.000550	.000325	.....	.....	
7,500	30,000	.000900	.000350	.....	.....	
10,000	40,000	.001275	.000375	.....	.....	
11,250	45,000	.001425	.000150	—.000025	—.000025	
12,500	50,000	.001625	.000200	0.	.000025	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001675	.000025	.....	.....	
13,250	53,000	.001725	.000050	.....	.....	
13,500	54,000	.001775	.000050	.....	.....	
13,750	55,000	.001800	.000025	.....	.....	Elastic limit.
14,000	56,000	.001900	.000100	.....	.....	
14,250	57,000	.002000	.000100	.....	.....	
14,500	58,000	.002300	.000300	.....	.....	
15,000	60,000	.002825	.000525	.....	.....	
15,500	62,010	.003425	.000600	.....	.....	
16,000	64,000	.005000	.001575	.....	.....	
16,500	66,000	.006750	.001750	.....	.....	
17,000	68,000	.008125	.001375	.....	.....	
27,480	109,920	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	109,920
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.064
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		1".40 from neck
Character of broken surface		granular; silky center
Elongation of inch sections		".15, ".21, ".12, ".11

No. 4148.

Marks, $\frac{12\ M\ R_2\ B_2}{T_2\ I}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000300	.000150	.....	.....	
5,000	20,000	.000575	.000275	.....	.....	
7,500	30,000	.000950	.000375	.....	.....	
10,000	40,000	.001275	.000325	.....	.....	
11,250	45,000	.001450	.000175	0.	.....	
12,500	50,000	.001650	.000200	0.	.....	
12,750	51,000	.001675	.000025	.....	.....	
13,000	52,000	.001700	.000025	.....	.....	
13,250	53,000	.001750	.000050	.....	.....	
13,500	54,000	.001800	.000050	.....	.....	Elastic limit.
13,750	55,000	.001900	.000100	.....	.....	
14,000	56,000	.002000	.000100	.....	.....	
14,250	57,000	.002125	.000125	.....	.....	
14,750	59,000	.002450	.000325	.....	.....	
15,250	61,000	.003125	.000675	.....	.....	
15,750	63,000	.004200	.001075	.....	.....	
16,250	65,000	.005750	.001550	.....	.....	
16,750	67,000	.007500	.001750	.....	.....	
27,290	109,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	109,160
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1325
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.084
Reduction in area after rupture, per centum of original section		27.6
Position of rupture		2". 15 from neck
Character of broken surface		granular; silky center
Elongation of inch sections		". 09, ". 20, ". 15, ". 09

No. 4149.

Marks, $\frac{12\ M\ R_2\ B_6}{T_4\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000275	.000150	.....	.....	
5,000	20,000	.000600	.000325	.....	.....	
7,500	30,000	.000950	.000350	.....	.....	
10,000	40,000	.001300	.000350	.....	.....	
11,250	45,000	.001475	.000175	0.	.....	
12,500	50,000	.001675	.000200	0.	.....	
12,750	51,000	.001700	.000025	.....	.....	
13,000	52,000	.001750	.000050	.....	.....	
13,250	53,000	.001775	.000025	.....	.....	Elastic limit.
13,500	54,000	.001900	.000125	.....	.....	
13,750	55,000	.002100	.000200	.....	.....	
14,000	56,000	.002275	.000175	.....	.....	
14,500	58,000	.002825	.000550	.....	.....	
15,000	60,000	.003875	.001050	.....	.....	
15,500	62,000	.005250	.001375	.....	.....	
16,000	64,000	.006750	.001500	.....	.....	
16,500	66,000	.008450	.001700	.....	.....	
26,970	107,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,880
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.001775
Reduction in diameter at point of rupture	do...	.074
Reduction in area after rupture, per centum of original section		24.6
Position of rupture		2".20 from neck
Character of broken surface		granular, radiating from a dull spot at the circumference.
Elongation of inch sections		".10, ".18, ".21*, ".11

12-INCH B. L. MORTAR, NO. 9.

HOOP A_4.

No. 4125.

Marks, $^{12\ M\ B_2\ A_4}_{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Ganged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	.....	.....	
2,500	10,000	.000400	.000250	.....	.....	
5,000	20,000	.000725	.000325	.....	.....	
7,500	30,000	.001050	.000325	.....	.....	
10,000	40,000	.001450	.000400	.....	.....	
11,250	45,000	.001600	.000150	.000025	.000025	
12,500	50,000	.001800	.000200	.000025	0.	
12,750	51,000	.001850	.000050	.....	.....	
13,000	52,000	.001900	.000050	.....	.....	
13,250	53,000	.001950	.000050	.....	.....	
13,500	54,000	.002000	.000050	.....	.....	Elastic limit.
13,750	55,000	.002100	.000100	.....	.....	
14,000	56,000	.002350	.000250	.....	.....	
14,250	57,000	.002600	.000250	.....	.....	
14,750	59,000	.004050	.001450	.....	.....	
15,250	61,000	.005875	.001825	.....	.....	
15,750	63,000	.007750	.001875	.....	.....	
16,250	65,000	.009375	.001625	.....	.....	
16,750	67,000	.011250	.001875	.....	.....	
25,580	102,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,320
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1750
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.114
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1".40 from neck
Character of broken surface		silky center; granular at circumference
Elongation of inch sections		".11, ".14, ".29, ".16

HOOP A_6.

No. 4144.

Marks, $\frac{12\ M\ R_2\ A_6}{T_1\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000300	.000150	.....	.....	
5,000	20,000	.000700	.000400	.....	.....	
7,500	30,000	.001025	.000325	.....	.....	
10,000	40,000	.001350	.000325	.....	.....	
11,250	45,000	.001475	.000125	0.	.....	
12,500	50,000	.001650	.000175	0.	.....	
12,750	51,000	.001700	.000050	.....	.....	
13,000	52,000	.001725	.000025	.....	.....	
13,250	53,000	.001775	.000050	.....	.....	
13,500	54,000	.001825	.000050	.....	.....	Elastic limit.
13,750	55,000	.001925	.000100	.....	.....	
14,000	56,000	.002075	.000150	.....	.....	
14,250	57,000	.002200	.000125	.....	.....	
14,750	59,000	.003000	.000800	.....	.....	
15,250	61,000	.004250	.001250	.....	.....	
15,750	63,000	.006500	.002250	.....	.....	
16,250	65,000	.008450	.001950	.....	.....	
16,750	67,000	.010250	.001800	.....	.....	
25,580	102,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,320
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.1675
Elongation per inch under strain at elastic limit	do...	.001825
Reduction in diameter at point of rupture	do...	.094
Reduction in area after rupture, per centum of original section		30.6
Position of rupture		1".75 from neck
Character of broken surface		granular; dull eccentric spot
Elongation of inch sections		".11, ."15, ".28", ".13

Hoop B_1.

No. 4142.

Marks, $\frac{12\ M\ R_9\ B_1}{T.\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000325	.000175	.....	.....	
5,000	20,000	.000700	.000375	.....	.....	
7,500	30,000	.001075	.000375	.....	.....	
10,000	40,000	.001450	.000375	.....	.....	
11,250	45,000	.001625	.000175	.000025	.000025	
12,500	50,000	.001800	.000175	.000025	0.	
12,750	51,000	.001825	.000025	.....	.....	
13,000	52,000	.001875	.000050	.....	.....	
13,250	53,000	.001925	.000050	.....	.....	
13,500	54,000	.002000	.000075	.....	.....	
13,750	55,000	.002025	.000025	.....	.....	
14,000	56,000	.002050	.000025	.....	.....	
14,250	57,000	.002125	.000075	.....	.....	Elastic limit.
14,500	58,000	.002250	.000125	.....	.....	
14,750	59,000	.002350	.000100	.....	.....	
15,000	60,000	.002700	.000350	.....	.....	
15,500	62,000	.004375	.001675	.....	.....	
16,000	64,000	.006500	.002125	.....	.....	
16,500	66,000	.008375	.001875	.....	.....	
17,000	68,000	.010050	.001675	.....	.....	
17,500	70,000	.012050	.002000	.....	.....	
26,080	104,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,320
Elastic limit per square inch of original section	do..	57,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002125
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1.″75 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		″.10, ″.16, ″.34*, ″16

Hoop B_5.

No. 4150.

Marks, $\frac{12\ M\ R_{11}\ B_5}{T,\ O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000275	.000175	.....	.....	
5,000	20,000	.000575	.000300	.....	.....	
7,500	30,000	.000950	.000375	.....	.....	
10,000	40,000	.001275	.000325	.....	.....	
11,250	45,000	.001425	.000150	0.	.....	
12,500	50,000	.001600	.000175	0.	.....	
12,750	51,000	.001650	.000050	.....	.....	
13,000	52,000	.001675	.000025	.....	.....	
13,250	53,000	.001725	.000050	.....	.....	
13,500	54,000	.001750	.000025	.....	.....	
13,750	55,000	.001775	.000025	.....	.....	Elastic limit.
14,000	56,000	.001850	.000075	.....	.....	
14,250	57,000	.002025	.000175	.....	.....	
14,500	58,000	.002250	.000225	.....	.....	
15,000	60,000	.002950	.000700	.....	.....	
15,500	62,000	.004625	.001675	.....	.....	
16,000	64,000	.006500	.001875	.....	.....	
16,500	66,000	.008625	.002125	.....	.....	
17,000	68,000	.010375	.001750	.....	.....	
25,820	103,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,280
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.001775
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1.70 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".12, ".15, ".38*, ".12

12-INCH B. L. MORTAR, NO. 12.

HOOP, A_4.

No. 4151.

Marks, $^{12\ M\ B_{12}\ A_4}_{T,\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000150	.000150	0.	.....	
2,500	10,000	.000300	.000150	.....	.....	
5,000	20,000	.000625	.000325	.....	.....	
7,500	30,000	.001025	.000400	.....	.....	
10,000	40,000	.001300	.000275	.....	.....	
11,250	45,000	.001475	.000175	0.	.....	
12,500	50,000	.001650	.000175	0.	.....	
12,750	51,000	.001700	.000050	.....	.....	
13,000	52,000	.001750	.000050	.....	.....	
13,250	53,000	.001775	.000025	.....	.....	
13,500	54,000	.001825	.000050	.....	.....	
13,750	55,000	.001875	.000050	.....	.....	Elastic limit.
14,000	56,000	.002050	.000175	.....	.....	
14,250	57,000	.002375	.000325	.....	.....	
14,500	58,000	.002925	.000550	.....	.....	
15,000	60,000	.004750	.001825	.....	.....	
15,500	62,000	.006700	.001950	.....	.....	
16,000	64,000	.008375	.001675	.....	.....	
16,500	66,000	.010000	.001625	.....	.....	
17,000	68,000	.011875	.001875	.....	.....	
25,620	102,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,480
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001875
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″.45 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		″.10, ″.12, ″.29*, ″17

Hoop B_3.

No. 4261.

Marks, $\frac{12\ M\ R_{12}\ B_3}{T.\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000225	.000125	.....	.....	
5,000	20,000	.000550	.000325	.....	.....	
7,500	30,000	.000900	.000350	.....	.....	
10,000	40,000	.001250	.000350	.....	.....	
11,250	45,000	.001425	.000175	0.	.....	
12,500	50,000	.001600	.000175	.000025	.000025	
12,750	51,000	.001650	.000050	.....	.....	
13,000	52,000	.001700	.000050	.....	.....	
13,250	53,000	.001725	.000025	.....	.....	
13,500	54,000	.001750	.000025	.....	.....	
13,750	55,000	.001825	.000075	.....	.....	Elastic limit.
14,000	56,000	.002075	.000250	.....	.....	
14,250	57,000	.002525	.000450	.....	.....	
14,500	58,000	.003675	.001150	.....	.....	
15,000	60,000	.005725	.002050	.....	.....	
15,500	62,000	.007250	.001525	.....	.....	
16,000	64,000	.008750	.001500	.....	.....	
16,500	66,000	.010700	.001950	.....	.....	
17,000	68,000	.012400	.001700	.....	.....	
25,390	101,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,560
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1750
Elongation per inch under strain at elastic limit	do...	.001825
Reduction in diameter at point of rupture	do ..	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		at middle of stem
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".10, ".22", ".26", ".12

12-INCH B. L. MORTAR, NO. 15.

HOOP A_3.

No. 4268.

Marks, $^{12\ M\ R_{15}\ A_3}_{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,200	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
5,000	20,000	.000650	.000350	.....	.....	
7,500	30,000	.000950	.000300	.....	.....	
10,000	40,000	.001275	.000325	.....	.....	
11,250	45,000	.001450	.000175	0.	.....	
12,500	50,000	.001625	.000175	0.	.....	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001700	.000050	.....	.....	
13,250	53,000	.001750	.000050	.....	.....	
13,500	54,000	.001775	.000025	.....	.....	
13,750	55,000	.001825	.000050	.....	.....	
14,000	56,000	.001875	.000050	.....	.....	
14,250	57,000	.001900	.000025	.....	.....	
14,500	58,000	.001950	.000050	.....	.....	
14,750	59,000	.001975	.000025	.....	.....	
15,000	60,000	.002025	.000050	.....	.....	
15,250	61,000	.002050	.000025	.....	.....	
15,500	62,000	.002075	.000025	.....	.....	
15,750	63,000	.002125	.000050	.....	.....	Elastic limit.
16,000	64,000	.002250	.000125	.....	.....	
16,250	65,000	.002325	.000075	.....	.....	
16,500	66,000	.002450	.000125	.....	.....	
17,000	68,000	.003050	.000600	.....	.....	
17,500	70,000	.004775	.001725	.....	.....	
18,000	72,000	.006700	.001925	.....	.....	
18,500	74,000	.008450	.001750	.....	.....	
28,120	112,480	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	112,480
Elastic limit per square inch of original section	do...	63,000
Elongation per inch after rupture	inch..	.1475
Elongation per inch under strain at elastic limit	do...	.002125
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.25 from neck
Character of broken surface		granular, silky center
Elongation of inch sections		″.16, ″.22, ″.12, ″.09

Hoop B_1.

No. 4262.

Marks, $\frac{12\ M\ R_{15}\ B_1}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000350	.000225	.....	.....	
5,000	20,000	.000650	.000300	.....	.....	
7,500	30,000	.000950	.000300	.....	.....	
10,000	40,000	.001275	.000325	.....	.....	
11,250	45,000	.001450	.000175	0.	.....	
12,500	50,000	.001625	.000175	0.	.....	
12,750	51,000	.001650	.000025	.....	.....	
13,000	52,000	.001675	.000025	.....	.....	
13,250	53,000	.001700	.000025	.....	.....	
13,500	54,000	.001750	.000050	.....	.....	
13,750	55,000	.001775	.000025	.....	.....	
14,000	56,000	.001825	.000050	.....	.....	
14,250	57,000	.001850	.000025	.....	.....	
14,500	58,000	.001900	.000050	.....	.....	
14,750	59,000	.001950	.000050	.....	.....	
15,000	60,000	.002000	.000050	.....	.....	
15,250	61,000	.002050	.000050	.....	.....	Elastic limit.
15,500	62,000	.002275	.000225	.....	.....	
15,750	63,000	.002575	.000300	.....	.....	
16,000	64,000	.003625	.001050	.....	.....	
16,500	66,000	.005750	.002125	.....	.....	
17,000	68,000	.007575	.001825	.....	.....	
17,500	70,000	.009125	.001550	.....	.....	
18,000	72,000	.011000	.001875	.....	.....	
18,500	74,000	.013000	.002000	.....	.....	
26,290	105,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section.....pounds.. 105,16[illegible]
Elastic limit per square inch of original section.....do.... 61,0[illegible]
Elongation per inch after rupture.....inch.. .17[illegible]
Elongation per inch under strain at elastic limit.....do.... .0020[illegible]
Reduction in diameter at point of rupture.....do.... .1[illegible]
Reduction in area after rupture, per centum of original section..... 47[illegible]
Position of rupture.....1″.30 from n[illegible]
Character of broken surface.....sil[illegible]
Elongation of inch sections.....″.25, ″.23, ″.12, ″.[illegible]

HOOP. B_1.

No. 4266.

Marks, $\frac{12\ M\ R_{16}\ B_1}{T.\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000325	.000225	.....	.....	
5,000	20,000	.000700	.000375	.....	.....	
7,500	30,000	.001025	.000325	.....	.....	
10,000	40,000	.001350	.000325	.....	.....	
11,250	45,000	.001550	.000200	.000025	.000025	
12,500	50,000	.001725	.000175	.000025	0.	
12,750	51,000	.001750	.000025	.....	.....	
13,000	52,000	.001775	.000025	.....	.....	
13,250	53,000	.001825	.000050	.....	.....	
13,500	54,000	.001875	.000050	.....	.....	Elastic limit.
13,750	55,000	.001975	.000100	.....	.....	
14,000	56,000	.002100	.000125	.....	.....	
14,250	57,000	.002250	.000150	.....	.....	
14,750	59,000	.002575	.000325	.....	.....	
15,250	61,000	.003750	.001175	.....	.....	
15,750	63,000	.005300	.001550	.....	.....	
16,250	65,000	.006875	.001575	.....	.....	
16,750	67,000	.008375	.001500	.....	.....	
26,170	104,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,680
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	1725
Elongation per inch under strain at elastic limit	do...	.001875
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2″.25 from neck
Character of broken surface		granular at circumference; silky center
Elongation of inch sections		″10, ″.21, ″.29, ″.09

12-INCH B. L. MORTAR, NO. 17.

HOOP A_4.

No. 4269.

Marks, $\frac{12\ M\ B_H\ A_4}{T_1\ 0}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	
1,250	5,000	.000075	.000075	0.	.....	Initial load.
2,500	10,000	.000300	.000225	.....	.....	
5,000	20,000	.000625	.000325	.....	.....	
7,500	30,000	.001000	.000375	.....	.....	
10,000	40,000	.001300	.000300	.....	.....	
11,250	45,000	.001450	.000150	.000025	.000025	
12,500	50,000	.001625	.000175	.000025	0.	
12,750	51,000	.001700	.000075	.....	.....	
13,000	52,000	.001725	.000025	.....	.....	
13,250	53,000	.001775	.000050	.....	.....	
13,500	54,000	.001800	.000025	.....	.....	
13,750	55,000	.001825	.000025	.....	.....	
14,000	56,000	.001850	.000025	.....	.....	
14,250	57,000	.001875	.000025	.....	.....	
14,500	58,000	.001975	.000100	.....	.....	
14,750	59,000	.002000	.000025	.....	.....	
15,000	60,000	.002025	.000025	.....	.....	
15,250	61,000	.002050	.000025	.....	.....	Elastic limit.
15,500	62,000	.002150	.000100	.....	.....	
15,750	63,000	.002275	.000125	.....	.....	
16,000	64,000	.002525	.000250	.....	.....	
16,500	66,000	.003725	.001200	.....	.....	
17,000	68,000	.005325	.001600	.....	.....	
17,500	70,000	.007150	.001825	.....	.....	
18,000	72,000	.008775	.001625	.....	.....	
18,500	74,000	.010275	.001500	.....	.....	
27,490	109,960	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	109,960
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.155
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2" from neck
Character of broken surface		silky
Elongation of inch sections		".08, ".13, ".30*, ".11

Hoop B_1.

No. 4264.

Marks, $\frac{12\ M\ R_{17}\ B_1}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation. per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000075	.000075	0.	.....	
2,500	10,000	.000300	.000225	.....	.....	
5,000	20,000	.000550	.000250	.....	.....	
7,500	30,000	.000875	.000325	.....	.....	
10,000	40,000	.001250	.000375	.....	.....	
11,250	45,000	.001400	.000150	0.	.....	
12,500	50,000	.001575	.000175	0.	.....	
12,750	51,000	.001600	.000025	.....	.....	
13,000	52,000	.001625	.000025	.....	.....	
13,250	53,000	.001650	.000025	.....	.....	
13,500	54,000	.001700	.000050	.....	.....	
13,750	55,000	.001750	.000050	.....	.....	
14,000	56,000	.001775	.000025	.....	.....	
14,250	57,000	.001800	.000025	.....	.....	
14,500	58,000	.001850	.000050	.....	.....	
14,750	59,000	.001875	.000025	.....	.....	
15,000	60,000	.001925	.000050	.....	.....	
15,250	61,000	.002000	.000075	.....	.....	Elastic limit.
15,500	62,000	.002125	.000125	.....	.....	
15,750	63,000	.002325	.000200	.....	.....	
16,000	64,000	.002750	.000425	.....	.....	
16,500	66,000	.004000	.001250	.....	.....	
17,000	68,000	.005500	.001500	.....	.....	
17,500	70,000	.007300	.001800	.....	.....	
18,000	72,000	.008825	.001515	.....	.....	
18,500	74,000	.010475	.001650	.....	.....	
27,360	109,440	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	109,440
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.1550
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per centum of original section		33.5
Position of rupture		1″.35 from neck
Character of broken surface	granular; silky, eccentric spot	
Elongation of inch sections		″.09, ″.12, ″24, ″.17

Specific gravity and hardness of cast-iron bodies and steel hoops. (No tension tests of these specimens.)

CAST-IRON BODIES.

No. of mortar.	Marks on specimen.	Specific gravity.	Hardness.	Remarks.
1	12 M C_1 T R_2 B T_1 I	7.2499	15.43	
1	12 M C_1 T R_2 B T_2 I	7.2525	15.20	
1	12 M C_1 T R_2 B T_3 M	7.2487	14.76	
1	12 M C_1 T R_2 B T_4	7.2508	15.83	
1	12 M C_1 T R_2 B L_6 I	7.2539	14.98	
1	12 M C_1 T R_2 B L_7 O	7.2384	15.75	
1	12 M C_1 T R_2 B L_8 M	7.2570	16.90	
1	12 M R_1 T R_1 M T_1	7.2424	15.83	
1	12 M R_1 T R_1 M T_2 I.....	7.2352	15.20	
1	12 M R_1 T R_1 M T_4 O	7.2268	13.72	
1	12 M R_1 T R_2 B T_2 I.....	7.2478	15.59	
1	12 M R_1 T R_2 B T_4 O.....	7.2456	15.51	
1	12 M R_1 T R_2 B L_8 M	7.2473	15.13	
2	12 M R_2 T R_2 B L_8	7.2359	16.23	
3	12 M R_3 T R_1 M T_2 I.....	7.2586	16.99	
3	12 M R_3 T R_1 M T_4 O	7.2566	17.99	
3	12 M R_3 T R_1 M T_5 M.....	7.2629	16.90	
3	12 M R_3 T R_2 B T_1	7.2564	16.56	
3	12 M R_3 T R_2 B T_3 M	7.2701	17.08	
3	12 M R_3 T R_2 B L_6 I	7.2677	16.31	
3	12 M R_3 T R_2 B L_7 O	7.2686	16.07	
3	12 M R_3 T R_2 B L_8 M	7.2733	16.90	
4	12 M R_4 T R_1 M T_1	7.2431	20.14	
4	12 M R_4 T R_1 M T_2 I.....	7.2462	19.39	
4	12 M R_4 T R_1 M T_4 O	7.2424	18.78	
4	12 M R_4 T R_1 M T_5 M.....	7.2505	18.78	
4	12 M R_4 T R_2 B T_2	7.2406	15.91	
4	12 M R_4 T R_2 B L_6 I	7.2511	16.64	
4	12 M R_4 T R_2 B L_7 O.....	7.2491	15.75	
4	12 M R_4 T R_2 B L_8 M	7.2492	15.59	
5	12 M R_5 T R_1 M T_1	7.2581	18.09	
5	12 M R_5 T R_1 M T_2 I	7.2677	19.29	
5	12 M R_5 T R_1 M T_4 O	7.2627	18.48	
5	12 M R_5 T R_1 M T_5 M.....	7.2690	18.28	
5	12 M R_5 T R_2 B T_2	7.2668	17.17	
5	12 M R_5 T R_2 B T_3 M	7.2675 7.2681	16.56 16.99	
5	12 M R_5 T R_2 B L_6 I	7.2677	16.47	
5	12 M R_5 T R_2 B L_7 O.....	7.2692	17.17	
5	12 M R_5 T R_2 B L_8 M	7.2660	15.59	
6	12 M R_6 T R_1 M T_1	7.2603	17.99	
6	12 M R_6 T R_1 M T_2 I.....	7.2703	19.71	
6	12 M R_6 T R_1 M T_4 O	7.2616	18.38	
6	12 M R_6 T R_1 M T_5 M.....	7.2780	18.68	
6	12 M R_6 T R_2 B T_2	7.2697	17.26	
6	12 M R_6 T R_2 B T_4 O.....	7.2713	16.07	
6	12 M R_6 T R_2 B L_6 I	7.2763	16.73	
6	12 M R_6 T R_2 B L_7 O.....	7.2761	16.31	
6	12 M R_6 T R_2 B L_8 M	7.2730	16.73	
7	12 M R_7 T R_1 M T_1	7.2802	17.99	
7	12 M R_7 T R_1 M T_2 I.....	7.2774	20.03	
7	12 M R_7 T R_1 M T_4 O	7.2781	18.19	
7	12 M R_7 T R_1 M T_5 M.....	7.2814	19.18	
7	12 M R_7 T R_2 B T_2	7.2350	14.47	
7	12 M R_7 T R_2 B L_6 I	7.2823	17.44	
7	12 M R_7 T R_2 B L_7 O.....	7.2776	15.59	
7	12 M R_7 T R_2 B L_8 M	7.2801	16.65	
8	12 M R_8 T R_1 M T_2 I	7.2805	17.44	
8	12 M R_8 T R_1 M T_4 O	7.2630	17.26	
8	12 M R_8 T R_1 M T_5 M.....	7.2803	17.61	
8	12 M R_8 T R_2 B T_2 I	7.2790	16.48	
8	12 M R_8 T R_2 B T_3 I x.....	7.2892	16.04	
8	12 M R_8 T R_2 B T_4 O.....	7.2709	15.83	
8	12 M R_8 T R_2 B L_6 I	7.2861	16.23	
8	12 M R_8 T R_2 B L_7 O.....	7.2905	16.82	
8	12 M R_8 T R_2 B L_8 M	7.2908	16.99	
9	12 M R_9 T R_1 M T_2 I.....	7.2973	20.47	

12-INCH B. L. RIFLED MORTARS.

TABULATION OF SPECIMENS FROM HOOPS AND GAS CHECKS.

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Specific gravity.	Hardness.
			Pounds.	*Pounds.*	*Per ct.*	*Per ct.*			
3917	Trunnion hoop, mortar No. 1	Outside	52,000	101,440	17.0	36.4	Granular, silky center		
3814	Trunnion hoop, mortar No. 2	do	53,000	101,440	16.3	36.4	do		
3928	Hoop A_7, mortar No. 2	do	51,000	105,240	12.8	21.4	Granular, dull spot		
3929	Hoop A_7, mortar No. 2	Middle	50,000	102,560	14.8	27.6	Granular, 80 per cent.; dull silky, 20 per cent		
3930	Hoop A_7, mortar No. 2	Inside	*50,000	97,880	15.8	36.4	Granular, 15 per cent.; dull silky, 85 per cent		
3924	Hoop B_3, mortar No. 2	Outside	56,000	105,280	16.5	27.6	Granular		
3925	Hoop B_3, mortar No. 2	Middle	51,000	101,040	15.3	33.5	Granular, dull silky spot		
3915	Hoop B_3, mortar No. 2	Outside	57,000	106,440	14.8	30.6	Granular, silky spot		
3816	Gas check, mortar No. 2	do	75,000	133,840	12.0	21.4	do		
3817	Gas check, mortar No. 2	Middle	70,000	129,680	10.3	21.4	Granular, silky center		
3824	Trunnion hoop, mortar No. 3	Outside	54,000	105,040	13.3	24.6	Granular		
3926	Hoop A_4, mortar No. 3	do	57,000	111,200	12.8	27.6	Granular, silky center		
3857	Hoop A_3, mortar No. 3	do	60,000	106,040	17.3	41.9	Silky and granular		
3840	Hoop B_1, mortar No. 3	do	57,000	108,160	15.8	33.5	Granular, silky center		
3927	Hoop B_3, mortar No. 3	do	53,000	108,360	15.0	27.6	do		
3876	Hoop A_3, mortar No. 4	do	59,000	107,920	14.0	27.6	do		
3879	Hoop A_4, mortar No. 4	do	59,000	107,560	15.5	33.5	do		
3882	Hoop B_4, mortar No. 4	do	57,000	103,920	17.3	36.4	Silky and granular		
3877	Hoop B_3, mortar No. 4	do	61,000	108,760	15.3	33.5	Granular, silky center		
3875	Trunnion hoop, mortar No. 4	do	58,000	106,320	15.3	33.5	do		
3880	Gas check, mortar No. 4	do	75,000	138,080	12.3	18.3	Granular, with dull spot		
3881	Gas check, mortar No. 4	Middle	†70,000	132,080	9.3	18.3	do		
3899	Hoop A_4, mortar No. 5	Inside	54,000	99,520	16.5	36.4	Granular, silky center		
3975	Hoop A_6, mortar No. 5	Outside	57,000	101,160	16.3	44.9	Silky and granular		
3922	Hoop B_3, mortar No. 5	do	58,000	108,280	17.0	33.5	Granular, silky center		
3923	Trunnion hoop, mortar No. 5	do	55,000	99,920	17.3	41.9	Silky and granular		
3974	Hoop A_4, mortar No. 6	do	59,000	102,040	17.8	44.6	Silky		
3916	Hoop B_4, mortar No. 6	do	60,000	104,280	18.0	39.2	Silky and granular		
3841	Gas check, mortar No. 6	do	76,000	132,800	13.3	27.6	Granular, dull spot		
3842	Gas check, mortar No. 6	Middle	†70,000	126,440	13.0	24.6	Granular, silky center		
4040	Hoop A_4, mortar No. 7	Outside	60,000	109,060	16.0	30.6	do	7.8425	22.77
4079	Hoop B_3, mortar No. 7	do	63,000	110,360	13.8	27.6	Granular, dull spot		
	Hoop B_1, mortar No. 8	do	51,000	107,280	15.0	27.6	do		
	No. 8	do	56,000	109,920	14.0	27.6	Granular, silky center		
		Inside	54,000	109,160	13.3	27.6	do		
		Middle	53,000	107,880	15.0	24.6	Granular, dull spot		
			54,000	102,320	17.5	36.4	Granular, silky center		
			52,000	102,320	16.8	30.6	Granular, dull spot		
				104,320	19.0	41.9	Silky and granular		

12-INCH B. L. RIFLED MORTARS.

4128	Hoop A_3, mortar No. 10	do	61,000	110,800	18.0	21.4	Granular, dull spot	.....	.....
4133	Hoop A_3, mortar No. 10	Middle	57,000	101,680	17.8	41.0	Silky and granular	.....	.....
4140	Hoop B_1, mortar No. 10	Outside	57,000	104,680	16.8	36.4	Granular, 60 per cent., silky, 40 per cent	.....	.....
4143	Hoop A_3, mortar No. 11	do	58,000	102,520	16.3	33.5	Granular, silky center	.....	.....
4148	Hoop A_3, mortar No. 11	Middle	58,000	103,280	16.0	41.9	Silky and granular	.....	.....
4150	Hoop B_2, mortar No. 11	Outside	58,000	102,480	17.0	39.2	...do	.....	.....
4151	Hoop A_3, mortar No. 12	do	61,000	111,040	14.8	33.5	Granular, silky center	.....	.....
4154	Hoop B_2, mortar No. 12	do	61,000	101,640	17.8	47.2	Silky, trace of granular	.....	.....
4156	Hoop A_3, mortar No. 13	Inside	58,000	100,120	17.5	41.9	Silky and granular	.....	.....
4166	Hoop B_2, mortar No. 13	Middle	58,000	95,280	20.8	52.2	Silky	.....	.....
4155	Hoop A_3, mortar No. 14	Outside	52,000	101,560	17.5	41.9	Silky and granular	.....	.....
4261	Hoop B_2, mortar No. 14	Middle	55,000	112,480	14.8	33.5	Granular, silky center	.....	.....
4268	Hoop A_3, mortar No. 15	Outside	63,000	108,160	17.5	47.2	Silky	.....	.....
4262	Hoop B_1, mortar No. 15	do	61,000	112,480	16.0	27.6	Granular, silky center	.....	.....
4265	Hoop A_3, mortar No. 16	do	59,000	104,680	17.3	39.2	...do	.....	.....
4269	Hoop B_1, mortar No. 16	do	54,000	109,960	15.5	39.2	Silky	.....	.....
4264	Hoop A_3, mortar No. 17	do	61,000	109,440	15.5	33.5	Granular, silky spot	.....	.....
4267	Hoop B_1, mortar No. 17	do	61,000	111,120	15.3	33.5	Granular, silky center	.....	.....
	Hoop B_1, mortar No. 18	do	62,000						

* Below 50,000 pounds.

† Below 70,000 pounds.

No. 3838.

Sample 2.

Diameter, ".220.
Sectional area, .038 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
190	5,000	0.	0.	0.	0.	Initial load.
760	20,000	.00064	.00064	.....	.....	
1,520	40,000	.00158	.00094	.....	.....	
1,900	50,000	.00237	.00079	.....	.....	
1,938	51,000	.00249	.00012	.....	.....	
1,976	52,000	.00256	.00007	.....	.....	
2,014	53,000	.00262	.00006	.....	.....	
2,052	54,000	.00273	.00011	.....	.....	
2,090	55,000	.00278	.00005	.....	.....	
2,128	56,000	.00289	.00011	.....	.....	
2,166	57,000	.00310	.00021	.....	.....	
2,204	58,000	.00328	.00018	.....	.....	
2,242	59,000	.00348	.00020	.....	.....	
2,280	60,000	.00363	.00015	.....	.....	Elastic limit.
2,318	61,000	.00390	.00027	.....	.....	
2,356	62,000	.00420	.00030	.....	.....	
2,394	63,000	.00460	.00040	.....	.....	
2,432	64,000	.00510	.00050	.....	.....	
2,470	65,000	.00630	.00120	.....	.....	
2,508	66,000	.008	.00170	.....	.....	
2,584	68,000	.019	.011	.....	.....	
2,660	70,000	.022	.003	.....	.....	
2,812	74,000	.024	.002	.....	.....	
2,964	78,000	.030	.006	.....	.....	
3,116	82,000	.036	.006	.....	.....	
3,268	86,000	.041	.005	.....	.....	
3,420	90,000	.051	.010	.....	.....	
3,572	94,000	.063	.012	.....	.....	
3,724	98,000	.070	.007	.....	.....	
3,800	100,000	.085	.015	.....	.....	
3,876	102,000	.100	.015	.....	.....	
3,890	102,390	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,390
Elastic limit per square inch of original section	do...	60,000
Elongation per inch after rupture	inch..	.120
Elongation per inch under strain at elastic limit	do...	.00363
Reduction in diameter at point of rupture	do...	.060
Reduction in area after rupture, per centum of original section		47.4
Position of rupture		2".35 inside the gauged section
Character of broken surface		fine silky

No. 3840.

Sample 4.

Diameter, ".220.
Sectional area, .038 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
190	5,000	0.	0.	0.	0.	Initial load.
760	20,000	.00058	.00058	.....	.....	
1,520	40,000	.00141	.00083	.....	.....	
1,900	50,000	.00187	.00046	.....	.....	
1,938	51,000	.00198	.00011	.....	.....	
1,976	52,000	.00208	.00010	.....	.....	
2,014	53,000	.00212	.00004	.....	.....	
2,052	54,000	.00218	.00006	.....	.....	
2,090	55,000	.00223	.00005	.....	.....	
2,128	56,000	.00231	.00008	.....	.....	
2,166	57,000	.00240	.00009	.....	.....	
2,204	58,000	.00248	.00008	.....	.....	
2,242	59,000	.00255	.00007	.....	.....	
2,280	60,000	.00268	.00013	.....	.....	
2,318	61,000	.00278	.00010	.....	.....	
2,356	62,000	.00285	.00007	.....	.....	
2,394	63,000	.00293	.00008	.....	.....	
2,432	64,000	.00310	.00017	.....	.....	
2,470	65,000	.00320	.00010	.....	.....	
2,508	66,000	.00331	.00011	.....	.....	Elastic limit.
2,546	67,000	.00348	.00017	.....	.....	
2,584	68,000	.00363	.00015	.....	.....	
2,622	69,000	.00382	.00019	.....	.....	
2,660	70,000	.00408	.00026	.....	.....	
2,698	71,000	.00434	.00026	.....	.....	
2,736	72,000	.00468	.00034	.....	.....	
2,774	73,000	.00510	.00042	.....	.....	
2,812	74,000	.00583	.00073	.....	.....	
2,850	75,000	.00790	.00207	.....	.....	
2,888	76,000	.01470	.00680	.....	.....	
2,964	78,000	.031	.0163	.....	.....	
3,116	82,000	.037	.006	.....	.....	
3,268	86,000	.043	.006	.....	.....	
3,420	90,000	.053	.010	.....	.....	
3,572	94,000	.068	.015	.....	.....	
3,724	98,000	.092	.024	.....	.....	
3,800	100,000	.120	.028	.....	.....	
3,810	100,260	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100,260
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	0.142
Elongation per inch under strain at elastic limit	do...	.00331
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per centum of original section		50.3
Position of rupture		3".3 inside the gauged section
Character of broken surface		fine, silky

No. 3841.

Sample 5.

Diameter, ".218.
Sectional area, .037 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
185	5,000	0.	0.	0.	0.	Initial load.
740	20,000	.00069	.00069			
1,480	40,000	.00177	.00108			
1,850	50,000	.00283	.00106			
1,887	51,000	.00296	.00013			
1,924	52,000	.00310	.00014			
1,961	53,000	.00330	.00020			
1,998	54,000	.00342	.00012			
2,035	55,000	.00355	.00013			Elastic limit.
2,072	56,000	.00398	.00043			
2,109	57,000	.00428	.00030			
2,146	58,000	.00478	.00050			
2,183	59,000	.00510	.00032			
2,220	60,000	.00576	.00066			
2,257	61,000	.00618	.00042			
2,294	62,000	.00680	.00062			
2,331	63,000	.00770	.00090			
2,368	64,000	.00830	.00060			
2,405	65,000	.00895	.00065			
2,442	66,000	.00947	.00052			
2,479	67,000	.01013	.00066			
2,516	68,000	.01085	.00072			
2,590	70,000	.013	.00215			
2,738	74,000	.018	.005			
2,886	78,000	.020	.002			
3,034	82,000	.023	.003			
3,182	86,000	.027	.004			
3,330	90,000	.030	.003			
3,478	94,000	.036	.006			
3,626	98,000	.042	.006			
3,700	100,000	.048	.006			
3,774	102,000	.053	.005			
3,848	104,000	.056	.003			
3,922	106,000	.064	.008			
3,996	108,000	.075	.011			
4,070	110,000					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,000
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.082
Elongation per inch under strain at elastic limit	do...	.00355
Reduction in diameter at point of rupture	do...	.033
Reduction in area after rupture, per centum of original section		27.3
Position of rupture		at end of gauged section.
Character of broken surface		granular, 60 per cent.; silky, 40 per cent.

No. 3842.

Sample 6.

Diameter, ".212.
Sectional area, .035 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
185	5,000	0.	0.	0.	0.	Initial load.
700	20,000	.00059	.00059	.....	.....	
1,400	40,000	.00139	.00080	.....	.....	
1,750	50,000	.00205	.00066	.....	.....	
1,785	51,000	.00210	.00005	.....	.....	
1,820	52,000	.00217	.00007	.....	.....	
1,855	53,000	.00223	.00006	.....	.....	
1,890	54,000	.00230	.00007	.....	.....	
1,925	55,000	.00240	.00010	.....	.....	
1,960	56,000	.00250	.00010	.....	.....	
1,995	57,000	.00260	.00010	.....	.....	
2,030	58,000	.00266	.00006	.....	.....	
2,065	59,000	.00278	.00012	.....	.....	
2,100	60,000	.00290	.00012	.....	.....	
2,135	61,000	.00302	.00012	.....	.....	
2,170	62,000	.00312	.00010	.....	.....	
2,205	63,000	.00329	.00017	.....	.....	
2,240	64,000	.00350	.00021	.....	.....	
2,275	65,000	.00363	.00013	.....	.....	
2,310	66,000	.00380	.00017	.....	.....	Elastic limit.
2,345	67,000	.00410	.00030	.....	.....	
2,380	68,000	.00444	.00034	.....	.....	
2,415	69,000	.00482	.00038	.....	.....	
2,450	70,000	.00527	.00045	.....	.....	
2,485	71,000	.00565	.00038	.....	.....	
2,520	72,000	.00646	.00081	.....	.....	
2,555	73,000	.00768	.00122	.....	.....	
2,590	74,000	.010	.00232	.....	.....	
2,730	78,000	.023	.013	.....	.....	
2,870	82,000	.025	.002	.....	.....	
3,010	86,000	.030	.005	.....	.....	
3,150	90,000	.034	.004	.....	.....	
3,290	94,000	.041	.007	.....	.....	
3,430	98,000	.047	.006	.....	.....	
3,500	100,000	.052	.005	.....	.....	
3,570	102,000	.057	.005	.....	.....	
3,640	104,000	.062	.005	.....	.....	
3,710	106,000	.072	.010	.....	.....	
3,780	108,000	.083	.011	.....	.....	
3,850	110,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,000
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.092
Elongation per inch under strain at elastic limit	do....	.00380
Reduction in diameter at point of rupture	do....	.052
Reduction in area after rupture, per centum of original section		42.6
Position of rupture		1".85 outside the gauged section.
Character of broken surface		fine, silky.

No. 3843.

Sample 7.

Diameter, ".218.
Sectional area, .037 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
185	5,000	0.	0.	0.	0.	Initial load.
740	20,000	.00066	.00066			
1,480	40,000	.00142	.00076			
1,850	50,000	.00190	.00048			
2,220	60,000	.00248	.00058			
2,257	61,000	.00258	.00010			
2,294	62,000	.00269	.00011			
2,331	63,000	.00278	.00009			
2,368	64,000	.00288	.00010			
2,405	65,000	.00298	.00010			
2,442	66,000	.00310	.00012			
2,479	67,000	.00321	.00011			
2,516	68,000	.00332	.00011			Elastic limit.
2,553	69,000	.00350	.00018			
2,590	70,000	.00371	.00021			
2,627	71,000	.00388	.00017			
2,664	72,000	.00407	.00019			
2,701	73,000	.00438	.00031			
2,738	74,000	.00468	.00020			
2,775	75,000	.00511	.00043			
2,812	76,000	.00580	.00069			
2,856	78,000	.01420	.00840			
2,960	80,000	.034	.0198			
3,108	84,000	.041	.007			
3,256	88,000	.048	.007			
3,404	92,000	.058	.010			
3,552	96,000	.069	.011			
3,700	100,000	.089	.020			
3,816	103,140					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,140
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch..	.124
Elongation per inch under strain at elastic limit	do...	.00332
Reduction in diameter at point of rupture	do...	.068
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		2".70 outside the gauged section
Character of broken surface		fine silky

No. 3844.

Sample 8.

Diameter, ".225.
Sectional area, .039 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
195	5,000	0.	0.	0.	0.	Initial load.
780	20,000	.00061	.00061			
1,560	40,000	.00153	.00092			
1,950	50,000	.00217	.00064			
2,340	60,000	.00323	.00106			
2,379	61,000	.00336	.00013			
2,418	62,000	.00362	.00026			
2,457	63,000	.00377	.00015			Elastic limit.
2,496	64,000	.00405	.00028			
2,535	65,000	.00448	.00043			
2,574	66,000	.00482	.00034			
2,613	67,000	.00560	.00078			
2,652	68,000	.00603	.00043			
2,691	69,000	.00767	.00164			
2,730	70,000	.01085	.00318			
2,886	74,000	.021	.01015			
3,042	78,000	.027	.006			
3,198	82,000	.031	.004			
3,354	86,000	.037	.006			
3,510	90,000	.042	.005			
3,666	94,000	.052	.010			
3,822	98,000	.067	.015			
3,900	100,000	.075	.008			
3,978	102,000	.090	.015			
4,056	104,000	.140	.050			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,000
Elastic limit per square inch of original section	do...	63,000
Elongation per inch after rupture	inch..	.142
Elongation per inch under strain at elastic limit	do...	.00377
Reduction in diameter at point of rupture	do...	.055
Reduction in area after rupture, per centum of original section		41.8
Position of rupture		".25 inside the guaged length
Character of broken surface		fine silky

No. 3845.

Sample 9.

Diameter, ".217.
Sectional area, .037 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
185	5,000	0.	0.	0.	0.	Initial load.
740	20,000	.00065	.00065	.....	.....	
1,480	40,000	.00157	.00092	.....	.....	
1,850	50,000	.00225	.00068	.....	.....	
2,220	60,000	.00324	.00099	.....	.....	
2,257	61,000	.00331	.00007	.....	.....	
2,294	62,000	.00341	.00010	.....	.....	Elastic limit.
2,331	63,000	.00359	.00018	.....	.....	
2,368	64,000	.00379	.00020	.....	.....	
2,405	65,000	.00403	.00024	.....	.....	
2,442	66,000	.00435	.00032	.....	.....	
2,479	67,000	.00463	.00028	.....	.....	
2,516	68,000	.00513	.00050	.....	.....	
2,553	69,000	.00577	.00064	.....	.....	
2,590	70,000	.00814	.00237	.....	.....	
2,738	74,000	.021	.01286	.....	.....	
2,886	78,000	.026	.005	.....	.....	
3,034	82,000	.031	.005	.....	.....	
3,182	86,000	.036	.005	.....	.....	
3,330	90,000	.041	.005	.....	.....	
3,478	94,000	.049	.008	.....	.....	
3,626	98,000	.062	.013	.....	.....	
3,700	100,000	.070	.008	.....	.....	
3,774	102,000	.082	.012	.....	.....	
3,848	104,000	.099	.017	.....	.....	
3,897	105,320	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,320
Elastic limit per square inch of original section	do...	62,000
Elongation per inch after rupture	inch..	.130
Elongation per inch under strain at elastic limit	do...	.00341
Reduction in diameter at point of rupture	do...	.047
Reduction in area after rupture, per centum of original section		38.7
Position of rupture		at middle of length
Character of broken surface		fine silky

No. 3846.

Sample 10.

Diameter, ".218.
Sectional area, .037 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
185	5,000	0.	0.	0.	0.	Initial load.
740	20,000	.00059	.00059	.....	.....	
1,480	40,000	.00139	.00080	.....	.....	
1,850	50,000	.00182	.00043	.....	.....	
2,220	60,000	.00240	.00058	.....	.....	
2,257	61,000	.00247	.00007	.....	.....	
2,294	62,000	.00252	.00005	.....	.....	
2,331	63,000	.00260	.00008	.....	.....	
2,368	64,000	.00266	.00006	.....	.....	
2,405	65,000	.00272	.00006	.....	.....	
2,442	66,000	.00280	.00008	.....	.....	
2,479	67,000	.00288	.00008	.....	.....	
2,516	68,000	.00295	.00007	.....	.....	
2,553	69,000	.00306	.00011	.....	.....	
2,590	70,000	.00311	.00005	.....	.....	
2,627	71,000	.00326	.00015	.....	.....	
2,664	72,000	.00333	.00007	.....	.....	
2,701	73,000	.00343	.00010	.....	.....	
2,738	74,000	.00354	.00011	.....	.....	Elastic limit, approximate.
2,775	75,000	.00369	.00015	.....	.....	
2,812	76,000	.00387	.00018	.....	.....	
2,849	77,000	.00401	.00014	.....	.....	
2,886	78,000	.00433	.00032	.....	.....	
2,923	79,000	.00451	.00018	.....	.....	
2,960	80,000	.00491	.00040	.....	.....	
2,997	81,000	.00561	.00070	.....	.....	
3,034	82,000	.00760	.00199	.....	.....	
3,182	86,000	.024	.0164	.....	.....	
3,330	90,000	.030	.006	.....	.....	
3,478	94,000	.034	.004	.....	.....	
3,626	98,000	.041	.007	.....	.....	
3,700	100,000	.043	.002	.....	.....	
3,774	102,000	.048	.005	.....	.....	
3,848	104,000	.053	.005	.....	.....	
3,922	106,000	.058	.005	.....	.....	
4,070	110,000	.073	.015	.....	.....	
4,218	114,000	.110	.037	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	114,000
Elastic limit per square inch of original section (approximate)	do...	74,000
Elongation per inch after rupture	inch..	.118
Elongation per inch under strain at elastic limit	do...	.00354
Reduction in diameter at point of rupture	do...	.048
Reduction in area after rupture, per centum of original section		38.7
Position of rupture		".1 outside the gauged section
Character of broken surface		fine silky

SAMPLES FROM ENDS OF COILS AFTER SECOND DRAWING.

No. 3807.

Sample 1.

Sectional area, ".1496 × ."1503 = .022 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
110	5,000	0.	0.	0.	0.	Initial load.
440	20,000	.00075	.00075	.....	.....	
880	40,000	.00172	.00097	.....	.....	
1,320	60,000	.00284	.00112	.....	.....	
1,430	65,000	.00314	.00030	.....	.....	
1,540	70,000	.00351	.00037	.....	.....	Elastic limit.
1,650	75,000	.00392	.00041	.....	.....	
1,760	80,000	.00442	.00050	.....	.....	
1,870	85,000	.00506	.00064	.....	.....	
1,980	90,000	.00601	.00095	.....	.....	
2,090	95,000	.00722	.00121	.....	.....	
2,200	100,000	.01114	.00392	.....	.....	
2,245	102,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,040
Elastic limit per square inch of original section	do ..	70,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00351
Reduction in area after rupture, per centum of original section		54.5
Position of rupture		5". 95 outside the gauged section
Character of broken surface		fine silky

No. 3808.

Sample 2.

Sectional area, ″.1515 × ″.1513= 0229 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
114	5,000	0.	0.	0.	0.	Initial load.
458	20,000	.00073	.00073	.....	.....	
916	40,000	.00171	.00098	.....	.....	
1,374	60,000	.00287	.00116	.....	.....	
1,488	65,000	.00323	.00036	.....	.....	Elastic limit.
1,603	70,000	.00365	.00042	.....	.....	
1,717	75,000	.00422	.00057	.....	.....	
1,832	80,000	.00480	.00058	.....	.....	
1,946	85,000	.00583	.00103	.....	.....	
2,061	90,000	.00767	.00184	.....	.....	
2,175	95,000	.01417	.00650	.....	.....	
2,214	96,680	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,680
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00323
Reduction in area after rupture, per centum of original section		55.9
Position of rupture		1″.3 outside the gauged section
Character of broken surface		fine, silky

No. 3809.

Sample 3.

Sectional area, ″.1505×″.1495=.0225 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5,000	0.	0.	0.	0.	Initial load.
450	20,000	.00072	.00072	.....	.....	
900	40,000	.00166	.00094	.....	.....	
1,350	60,000	.00278	.00112	.....	.....	
1,462	65,000	.00308	.00030	.....	.....	
1,575	70,000	.00343	.00035	.....	.....	Elastic limit.
1,687	75,000	.00388	.00045	.....	.....	
1,800	80,000	.00441	.00053	.....	.....	
1,912	85,000	.00521	.00080	.....	.....	
2,025	90,000	.00637	.00116	.....	.....	
2,137	95,000	.00908	.00271	.....	.....	
2,215	98,440	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98,440
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.006
Elongation per inch under strain at elastic limit	do...	.00343
Reduction in area after rupture, per centum of original section		55.9
Position of rupture		5″.4 outside the gauged section
Character of broken surface		fine, silky

No. 3810.

Sample 4.

Sectional area, ″.1515×″.1514=.0229 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
114	5,000	0.	0.	0.	0.	Initial load.
458	20,000	.00068	.00068			
916	40,000	.00148	.00080			
1,374	60,000	.00257	.00109			
1,488	65,000	.00289	.00032			
1,603	70,000	.00318	.00029			
1,717	75,000	.00354	.00036			Elastic limit.
1,832	80,000	.00402	.00048			
1,946	85,000	.00458	.00056			
2,061	90,000	.00544	.00086			
2,175	95,000	.00710	.00166			
2,290	100,000	.009	.0019			
2,362	103,140					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,140
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.035
Elongation per inch under strain at elastic limit	do...	.00354
Reduction in area after rupture, per centum of original section		55.4
Position of rupture		2″.25 inside the gauged section
Character of broken surface		fine silky

No. 3811.

Sample 5.

Sectional area, ″.1500×″.1505=.0225 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
112	5,000	0.	0.	0.	0.	Initial load.
450	20,000	.00090	.00090			
900	40,000	.00180	.00090			
1,350	60,000	.00288	.00108			
1,462	65,000	.00317	.00029			
1,575	70,000	.00348	.00031			
1,687	75,000	.00380	.00032			
1,800	80,000	.00420	.00040			Elastic limit.
1,912	85,000	.00467	.00047			
2,025	90,000	.00520	.00053			
2,137	95,000	.00598	.00078			
2,250	100,000	.00696	.00098			
2,362	105,000	.00858	.00162			
2,420	107,560					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,560
Elastic limit per square inch of original section	do...	80,000
Elongation per inch after rupture	inch..	.003
Elongation per inch under strain at elastic limit	do...	.00420
Reduction in area after rupture, per centum of original section		30.7
Position of rupture		10″.75 outside the gauged section
Character of broken surface		fine silky

No. 3812.

Sample 6.

Sectional area, ".1512 × ".1506 = .0228 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
114	5,000	0.	0.	0.	.....	Initial load.
459	20,000	.00068	.00068	.....	.....	
912	40,000	.00166	.00098	.....	.....	
1,368	60,000	.00270	.00104	.....	.....	
1,482	65,000	.00294	.00024	.....	.....	Elastic limit.
1,596	70,000	.00340	.00046	.....	.....	
1,710	75,000	.00383	.00043	.....	.....	
1,824	80,000	.00432	.00049	.....	.....	
1,938	85,000	.00509	.00077	.....	.....	
2,052	90,000	.00602	.00093	.....	.....	
2,166	95,000	.00820	.00218	.....	.....	
2,280	100,000	.012	.0038	.....	.....	
2,318	101,670	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,670
Elastic limit per square inch of original section	do...	65,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00294
Reduction in area after rupture, per centum of original section		56.1
Position of rupture		3".6 outside the gauged section
Character of broken surface		fine, silky

There was a short twist in the wire at the place where rupture occurred.

No. 2813.

Sample 7.

Sectional area, ".1505 × ".1503 = .0226 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
113	5,000	0.	0.	0.	0.	Initial load.
452	20,000	.00072	.00072	.....	.....	
904	40,000	.00172	.00100	.....	.....	
1,356	60,000	.00280	.00108	.....	.....	
1,469	65,000	.00306	.00026	.....	.....	
1,582	70,000	.00337	.00031	.....	.....	
1,695	75,000	.00373	.00036	.....	.....	Elastic limit.
1,808	80,000	.00419	.00046	.....	.....	
1,921	85,000	.00464	.00045	.....	.....	
2,034	90,000	.00525	.00061	.....	.....	
2,147	95,000	.00625	.00100	.....	.....	
2,260	100,000	.00810	.00185	.....	.....	
2,373	105,000	.012	.0039	.....	.....	
2,422	107,170	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,170
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00373
Reduction in area after rupture, per centum of original section		58.4
Position of rupture		8" outside the gauged section
Character of broken surface		fine, silky

No. 3816.

Sample 10.

Sectional area, ″.1500×″.1487 = .0223 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
111	5,000	0.	0.	0.	0.	Initial load.
446	20,000	.00073	.00073	.....	.....	
892	40,000	.00167	.00094	.....	.....	
1,338	60,000	.00274	.00107	.....	.....	
1,449	65,000	.00303	.00029	.....	.....	
1,561	70,000	.00340	.00037	.....	.....	Elastic limit.
1,672	75,000	.00382	.00042	.....	.....	
1,784	80,000	.00423	.00041	.....	.....	
1,895	85,000	.00483	.00060	.....	.....	
2,007	90,000	.00540	.00057	.....	.....	
2,118	95,000	.00680	.00140	.....	.....	
2,230	100,000	.00906	.00226	.....	.....	
2,341	105,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	105,000
Elastic limit per square inch of original section	do...	70,000
Elongation per inch after rupture	inch..	.015
Elongation per inch under strain at elastic limit	do...	.00340
Reduction in area after rupture, per centum of original section		52.4
Position of rupture		″.75 inside the gauged section
Character of broken surface		fine, silky

SAMPLES FROM ENDS OF COILS AFTER 3D DRAWING, 1ST HOLE.

No. 3817.

Sample 1.

Sectional area, ".1170 × ".1172 = .0137 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
68	5,000	0.	0.	0.	0.	Initial load.
274	20,000	.00075	.00075			
548	40,000	.00163	.00088			
822	60,000	.00263	.00100			
1,096	80,000	.00371	.00108			
1,164	85,000	.00398	.00027			
1,233	90,000	.00430	.00032			
1,301	95,000	.00463	.00033			
1,370	100,000	.00508	.00045			
1,438	105,000	.00547	.00039			Elastic limit.
1,507	110,000	.00591	.00044			
1,575	115,000	.00641	.00050			
1,644	120,000	.00700	.00059			
1,712	125,000	.00763	.00063			
1,781	130,000	.00848	.00085			
1,849	135,000	.00965	.00117			
1,918	140,000	.01141	.00176			
1,986	145,000	.016	.00459			
2,055	150,000	.021	.005			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	150,000
Elastic limit per square inch of original section	do	105,000
Elongation per inch after rupture	inch	.011
Elongation per inch under strain at elastic limit	do	.00547
Reduction in area after rupture, per centum of original section		40.9
Position of rupture		2" outside the gauged length
Character of broken surface		fine, silky

No. 3818.

Sample 2.

Sectional area, ".1178×".1172=.0137 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
68	5,000	0.	0.	0.	0.	Initial load.
274	20,000	.00077	.00077			
548	40,000	.00162	.00085			
822	60,000	.00267	.00105			
1,096	80,000	.00363	.00096			
1,164	85,000	.00392	.00029			
1,233	90,000	.00424	.00032			
1,301	95,000	.00461	.00037			
1,370	100,000	.00499	.00038			Elastic limit.
1,438	105,000	.00542	.00043			
1,507	110,000	.00591	.00049			
1,575	115,000	.00646	.00055			
1,644	120,000	.00712	.00066			
1,712	125,000	.00784	.00072			
1,781	130,000	.00874	.00090			
1,849	135,000	.01007	.00133			
1,918	140,000	.014	.00393			
1,986	145,000	.017	.003			
2,050	149,640					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	149,640
Elastic limit per square inch of original section	do...	100,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00499
Reduction in area after rupture, per centum of original section		32.8
Position of rupture		2".9 outside the gauged length
Character of broken surface		fine, silky

No. 3820.

Sample 4.

Sectional area, ".1173×".1174=.0137 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
68	5,000	0.	0.	0.	0.	Initial load.
274	20,000	.00070	.00070	.....	.....	
548	40,000	.00160	.00090	.....	.....	
822	60,000	.00243	.00083	.....	.....	
1,096	80,000	.00350	.00107	.....	.....	
1,164	85,000	.00378	.00028	.....	.....	
1,233	90,000	.00407	.00029	.....	.....	
1,301	95,000	.00445	.00038	.....	.....	Elastic limit.
1,370	100,000	.00493	.00048	.....	.....	
1,438	105,000	.00540	.00047	.....	.....	
1,507	110,000	.00578	.00038	.....	.....	
1,575	115,000	.00631	.00053	.....	.....	
1,644	120,000	.00692	.00061	.....	.....	
1,712	125,000	.00764	.00072	.....	.....	
1,781	130,000	.00848	.00084	.....	.....	
1,849	135,000	.00940	.00092	.....	.....	
1,918	140,000	.01068	.00128	.....	.....	
1,986	145,000	.012	.00132	.....	.....	
2,055	150,000	.017	.005	.....	.....	
2,123	155,000	.022	.005	.....	.....	
2,140	156,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	156,200
Elastic limit per square inch of original section	do....	95,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do....	.00445
Reduction in area after rupture, per centum of original section		32.8
Position of rupture		".80 inside the gauged length
Character of broken surface		fine, silky

No. 3822.

Sample 6.

Sectional area, ″.1184×″.1185=.014 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
70	5,000	0.	0.	0.	0.	Initial load.
280	20,000	.00074	.00074	.....	.....	
560	40,000	.00160	.00086	.....	.....	
840	60,000	.00253	.00093	.....	.....	
1,120	80,000	.00358	.00105	.....	.....	
1,190	85,000	.00385	.00027	.....	.....	
1,260	90,000	.00421	.00036	.....	.....	
1,330	95,000	.00449	.00028	.....	.....	
1,400	100,000	.00487	.00038	.....	.....	
1,470	105,000	.00529	.00042	.....	.....	
1,540	110,000	.00568	.00039	.....	.....	Elastic limit.
1,610	115,000	.00621	.00053	.....	.....	
1,680	120,000	.00678	.00057	.....	.....	
1,750	125,000	.00743	.00065	.....	.....	
1,820	130,000	.00817	.00074	.....	.....	
1,890	135,000	.00908	.00091	.....	.....	
1,960	140,000	.01039	.00131	.....	.....	
2,030	145,900	.01195	.00156	.....	.....	
2,100	150,000	.017	.00505	.....	.....	
2,170	155,000	.023	.006	.....	.....	
2,184	156,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	156,000
Elastic limit per square inch of original section	do...	110,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00568
Reduction in area after rupture, per centum of original section		42.1
Position of rupture		″.50 inside the gauged section
Character of broken surface		fine, silky

No. 3824.

Sample 8.

Sectional area, ″.1193 × ″.1189 = .0142 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
71	5,000	0.	0.	0.	0.	Initial load.
284	20,000	.00078	.00078	.....	.....	
568	40,000	.00167	.00089	.....	.....	
852	60,000	.00262	.00095	.....	.....	
1,136	80,000	.00372	.00110	.....	.....	
1,207	85,000	.00401	.00029	.....	.....	
1,278	90,000	.00438	.00037	.....	.....	
1,349	95,000	.00478	.00040	.....	.....	
1,420	100,000	.00522	.00044	.....	.....	
1,491	105,000	.00565	.00043	.....	.....	Elastic limit.
1,562	110,000	.00618	.00053	.....	.....	
1,633	115,000	.00686	.00068	.....	.....	
1,704	120,000	.00749	.00063	.....	.....	
1,775	125,000	.00821	.00072	.....	.....	
1,846	130,000	.00924	.00103	.....	.....	
1,917	135,000	.01054	.00130	.....	.....	
1,988	140,000	.01262	.00208	.....	.....	
2,069	145,000	.018	.00538	.....	.....	
2,118	149,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.	149,150
Elastic limit per square inch of original section	do	105,000
Elongation per inch after rupture	inch	.013
Elongation per inch under strain at elastic limit	do	.00565
Reduction in area after rupture, per centum of original section		47.9
Position of rupture		″.45 outside the gauged section
Character of broken surface		fine, silky

No. 3826.

Sample 10.

Sectional area, ″.1165 × ″.1169 = .0136 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
68	5,000	0.	0.	0.	0.	Initial load.
272	20,000	.00075	.00075	.....	.....	
544	40,000	.00161	.00086	.....	.....	
816	60,000	.00265	.00104	.....	.....	
1,088	80,000	.00357	.00092	.....	.....	
1,156	85,000	.00372	.00015	.....	.....	
1,224	90,000	.00400	.00028	.....	.....	
1,292	95,000	.00426	.00026	.....	.....	
1,360	100,000	.00458	.00032	.....	.....	
1,428	105,000	.00496	.00038	.....	.....	
1,496	110,000	.00520	.00024	.....	.....	
1,564	115,000	.00565	.00045	.....	.....	Elastic limit.
1,632	120,000	.00605	.00040	.....	.....	
1,700	125,000	.00652	.00047	.....	.....	
1,768	130,000	.00705	.00053	.....	.....	
1,836	135,000	.00764	.00059	.....	.....	
1,904	140,000	.00830	.00066	.....	.....	
1,972	145,000	.00910	.00080	.....	.....	
2,040	150,000	.01012*	.00102	.....	.....	
2,108	155,000	.012	.00188	.....	.....	
2,176	160,000	.014	.002	.....	.....	
2,244	165,000	.020	.006	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	165,000
Elastic limit, per square inch of original section	do ..	115,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00565
Reduction in area after rupture, per centum of original section		45.6
Position of rupture	2″ outside the gauged section	
Character of broken surface	fine, silky	

No. 3828.

Sample 2.

Sectional area, ″.0992 × ″.0995 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00073	.00073	.....	.....	
396	40,000	.00160	.00087	.....	.....	
594	60,000	.00251	.00091	.....	.....	
792	80,000	.00351	.00100	.....	.....	
990	100,000	.00470	.00119	.....	.....	
1,039	105,000	.00491	.00021	.....	.....	
1,089	110,000	.00536	.00045	.....	.....	
1,138	115,000	.00578	.00042	.....	.....	
1,188	120,000	.00607	.00029	.....	.....	Elastic limit.
1,237	125,000	.00657	.00050	.....	.....	
1,287	130,000	.00720	.00063	.....	.....	
1,336	135,000	.00775	.00055	.....	.....	
1,386	140,000	.00848	.00073	.....	.....	
1,435	145,000	.00940	.00092	.....	.....	
1,485	150,000	.01073	.00133	.....	.....	
1,534	155,000	.01295	.00222	.....	.....	
1,584	160,000	.016	.00305	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	160,000
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.003
Elongation per inch under strain at elastic limit	do...	.00607
Reduction in area after rupture, per centum of original section		38.4
Position of rupture		9″ outside the gauged section
Character of broken surface		fine, silky

No. 3829.

Sample 3.

Sectional area, ″.1005 × ″.1012 = .01 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00078	.00078			
400	40,000	.00168	.00090			
600	60,000	.00261	.00093			
800	80,000	.00352	.00091			
1,000	100,000	.00458	.00106			
1,050	105,000	.00484	.00026			
1,100	110,000	.00517	.00033			
1,150	115,000	.00552	.00035			
1,200	120,000	.00590	.00038			
1,250	125,000	.00627	.00037			
1,300	130,000	.00668	.00041			Elastic limit.
1,350	135,000	.00717	.00049			
1,400	140,000	.00778	.00061			
1,450	145,000	.00850	.00072			
1,500	150,000	.00937	.00087			
1,550	155,000	.01057	.00120			
1,600	160,000	.01245	.00188			
1,650	165,000	.015	.00255			
1,700	170,000	.020	.005			
1,718	171,800					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	171,800
Elastic limit per square inch of original section	do	130,000
Elongation per inch after rupture	inch	.014
Elongation per inch under strain at elastic limit	do	.00668
Reduction in area after rupture, per centum of original section		45.0
Position of rupture		″.4 outside the gauged section
Character of broken surface		fine, silky

No. 3830.

Sample 4.

Sectional area, ".0999 × ".0998 = .0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00077	.00077	.....	.....	
396	40,000	.00160	.00083	.....	.....	
594	60,000	.00250	.00090	.....	.....	
792	80,000	.00344	.00094	.....	.....	
990	100,000	.00458	.00114	.....	.....	
1,039	105,000	.00480	.00022	.....	.....	
1,089	110,000	.00512	.00032	.....	.....	
1,138	115,000	.00545	.00033	.....	.....	
1,188	120,000	.00586	.00041	.....	.....	Elastic limit.
1,237	125,000	.00636	.00050	.....	.....	
1,287	130,000	.00683	.00047	.....	.....	
1,336	135,000	.00725	.00042	.....	.....	
1,386	140,000	.00791	.00066	.....	.....	
1,435	145,000	.00868	.00077	.....	.....	
1,485	150,000	.00963	.00095	.....	.....	
1,534	155,000	.011	.00137	.....	.....	
1,584	160,000	.013	.002	.....	.....	
1,633	165,000	.017	.004	.....	.....	
1,683	170,000	.....	.....	.....	.....	Ultimate strength.

General summary.

Tensile strength per square inch of original section	pounds..	170,000
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.016
Elongation per inch under strain at elastic limit	do...	.00586
Reduction in area after rupture, per centum of original section		38.4
Position of rupture		".90 outside the gauged section
Character of broken surface		fine, silky

No. 3832.

Sample 6.

Sectional area, ″.0997×″.0998=″.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00076	.00076	.....	.....	
396	40,000	.00162	.00086	.....	.....	
594	60,000	.00248	.00086	.....	.....	
792	80,000	.00348	.00100	.....	.....	
990	100,000	.00467	.00119	.....	.....	
1,039	105,000	.00485	.00018	.....	.....	
1,089	110,000	.00523	.00038	.....	.....	
1,138	115,000	.00565	.00042	.....	.....	
1,188	120,000	.00597	.00032	.....	.....	Elastic limit.
1,237	125,000	.00642	.00045	.....	.....	
1,287	130,000	.00695	.00053	.....	.....	
1,336	135,000	.00750	.00055	.....	.....	
1,386	140,000	.00840	.00090	.....	.....	
1,435	145,000	.00940	.00100	.....	.....	
1,485	150,000	.01080	.00140	.....	.....	
1,534	155,000	.01260	.00180	.....	.....	
1,584	160,000	.014	.00140	.....	.....	
1,633	165,000	.020	.006	.....	.....	
1,662	167,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	167,880
Elastic limit per square inch of original section	do...	.012
Elongation per inch after rupture	inch..	120,000
Elongation per inch under strain at elastic limit	do...	.00597
Reduction in area after rupture, per centum of original section		46.5
Position of rupture		1″.45 outside the gauged section
Character of broken surface		fine, silky

No. 3833.

Sample 7.

Sectional area, ″.1002 × ″.1014 = .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
202	20,000	.00088	.00088			
404	40,000	.00172	.00084			
606	60,000	.00277	.00105			
808	80,000	.00366	.00089			
1,010	100,000	.00487	.00121			
1,060	105,000	.00512	.00025			
1,111	110,000	.00552	.00040			
1,161	115,000	.00590	.00038			
1,212	120,000	.00633	.00043			Elastic limit.
1,262	125,000	.00685	.00052			
1,313	130,000	.00738	.00053			
1,363	135,000	.00800	.00062			
1,414	140,000	.00880	.00080			
1,464	145,000	.00970	.00090			
1,515	150,000	.01097	.00127			
1,565	155,000	.01285	.00188			
1,616	160,000	.017	.00415			
1,666	165,000	.021	.004			
1,684	166,730					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	166,730
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00633
Reduction in area after rupture, per centum of original section		44.5
Position of rupture		1″.30 inside the gauged length
Character of broken surface		fine, silky

No. 3834.

Sample 8.

Sectional area, ″.0994×″.0994=″.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00080	.00080	.....	.....	
396	40,000	.00160	.00080	.....	.....	
594	60,000	.00258	.00098	.....	.....	
792	80,000	.00358	.00100	.....	.....	
990	100,000	.00458	.00100	.....	.....	
1,039	105,000	.00478	.00020	.....	.....	
1,089	110,000	.00510	.00032	.....	.....	
1,138	115,000	.00542	.00032	.....	.....	
1,188	120,000	.00580	.00038	.....	.....	
1,237	125,000	.00620	.00040	.....	.....	
1,287	130,000	.00662	.00042	.....	.....	Elastic limit.
1,336	135,000	.00720	.00058	.....	.....	
1,386	140,000	.00777	.00057	.....	.....	
1,435	145,000	.00851	.00074	.....	.....	
1,485	150,000	.00942	.00091	.....	.....	
1,534	155,000	.01085	.00143	.....	.....	
1,584	160,000	.01285	.00200	.....	.....	
1,633	165,000	.017	.00415	.....	.....	
1,670	168,690	.020	.003	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	168,690
Elastic limit per square inch of original section	do	130,000
Elongation per inch after rupture	inch	.068
Elongation per inch under strain at elastic limit	do	.00662
Reduction in area after rupture, per centum of original section		40.4
Position of rupture		″.60 outside the gauged section
Character of broken surface		fine, silky

No. 3836.

Sample 10.

Sectional area, ″.1004×″.1006=.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00086	.00086	.....	.....	
400	40,000	.00167	.00081	.....	.....	
600	60,000	.00258	.00086	.....	.....	
800	80,000	.00343	.00090	.....	.....	
1,000	100,000	.00446	.00103	.....	.....	
1,050	105,000	.00473	.00027	.....	.....	
1,100	110,000	.00506	.00033	.....	.....	
1,150	115,000	.00537	.00031	.....	.....	
1,200	120,000	.00575	.00038	.....	.....	
1,250	125,000	.00610	.00035	.....	.....	Elastic limit.
1,300	130,000	.00653	.00043	.....	.....	
1,350	135,000	.00703	.00050	.....	.....	
1,400	140,000	.00760	.00057	.....	.....	
1,450	145,000	.00805	.00045	.....	.....	
1,500	150,000	.00870	.00065	.....	.....	
1,550	155,000	.00955	.00085	.....	.....	
1,600	160,000	.01040	.00085	.....	.....	
1,650	165,000	.01160	.00120	.....	.....	
1,700	170,000	.014	.00240	.....	.....	
1,750	175,000	.017	.003	.....	.....	
1,800	180,000	.024	.007	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,000
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.019
Elongation per inch under strain at elastic limit	do...	.00519
Reduction in area after rupture, per centum of original section		36.0
Position of rupture		1″.20 inside the gauged section
Character of broken surface		fine, silky

FINISHED WIRE ".1 SQUARE TINNED.

No. 3798.

Sample 1.

Sectional area, ".0986×".099=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00075	.00075			
388	40,000	.00150	.00075			
582	60,000	.00220	.00070			
776	80,000	.00298	.00078			
824	85,000	.00314	.00016			
873	90,000	.00332	.00018			
921	95,000	.00355	.00023			
970	100,000	.00375	.00020			
1,018	105,000	.00393	.00018			
1,067	110,000	.00418	.00025			
1,115	115,000	.00438	.00020			
1,164	120,000	.00463	.00025			
1,212	125,000	.00488	.00025			
1,261	130,000	.00513	.00025			
1,309	135,000	.00540	.00027			
1,358	140,000	.00568	.00028			
1,406	145,000	.00603	.00035			
1,455	150,000	.00642	.00039			Elastic limit.
1,503	155,000	.00698	.00056			
1,552	160,000	.00760	.00062			
1,600	165,000	.00872	.00112			
1,649	170,000	.01088	.00216			
1,697	175,000	.018	.00712			
1,736	179,180					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	179,180
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit	do...	.00642
Reduction in area after rupture, per centum of original section		37.1
Position of rupture	2".25 inside the gauged section	
Character of broken surface		fine, silky

No. 3799.

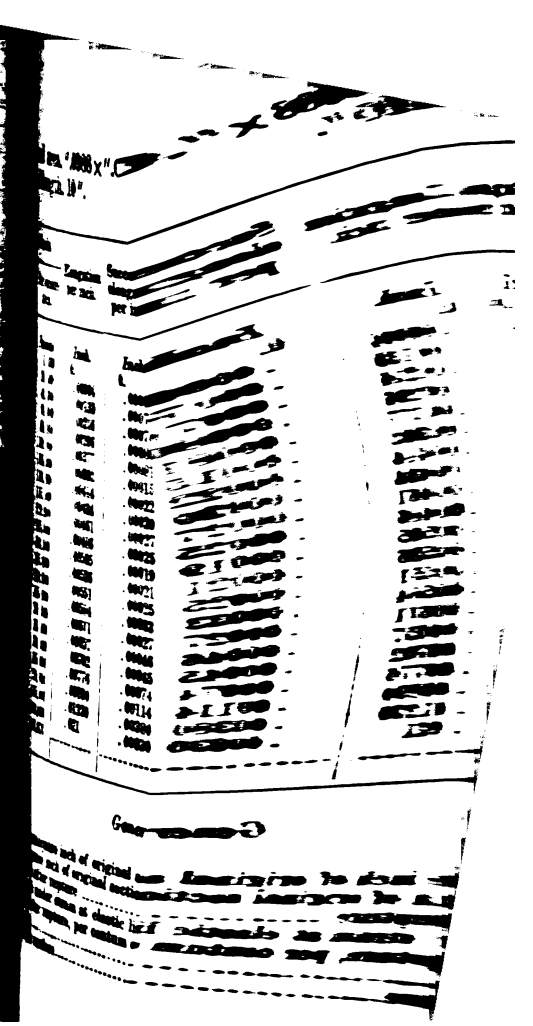
Sample 2.

.0993=.0098 square inch.

ıccessive longation per inch.	Permanent set.	Successive permanent set.	Remarks.
*Inch. 0.	Inch. 0.	Inch. 0.	Initial load.
.00065			
.00073			
.00082			
.00078			
.00076			
.00014			
.00023			
.00027			
.00024			
.00022			
.00029			
.00028			
.00031			
.00034			Elastic limit.
.00044			
.00066			
.00083			
.00240			
.00963			
			Tensile strength.

General summary.

inal section	pounds	174,290
l section	do	145,600
	inch	.015
tic limit	do	.00091
ıtum of original section		24.7
	5". 2 outside the gauged section	
		fine, silky



No. 3800.

Sample 3.

Sectional area, ".0988×".0994=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00064	.00064			
392	40,000	.00138	.00074			
588	60,000	.00216	.00078			
784	80,000	.00296	.00080			
980	100,000	.00377	.00081			
1,029	105,000	.00392	.00015			
1,078	110,000	.00414	.00022			
1,127	115,000	.00434	.00020			
1,176	120,000	.00461	.00027			
1,225	125,000	.00486	.00025			
1,274	130,000	.00505	.00019			
1,323	135,000	.00526	.00021			
1,372	140,000	.00551	.00025			
1,421	145,000	.00584	.00033			
1,470	150,000	.00611	.00027			Elastic limit.
1,519	155,000	.00657	.00046			
1,568	160,000	.00702	.00045			
1,617	165,000	.00776	.00074			
1,666	170,000	.00890	.00114			
1,715	175,000	.01270	.00380			
1,764	180,000	.021	.00830			
1,800	183,670					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	183,670
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	0.80
Elongation per inch under strain at elastic limit	do...	.00611
Reduction in area after rupture, per centum of original section		36.7
Position of rupture		3".75 inside the gauged section
Character of broken surface		fine, silky

No. 3801.

Sample 4.

Sectional area, ".0987×".0992=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	.0	Initial load.
196	20,000	.00077	.00077	.....	.....	
392	40,000	.00152	.00075	.....	.....	
588	60,000	.00235	.00083	.....	.....	
784	80,000	.00304	.00069	.....	.....	
980	100,000	.00395	.00091	.....	.....	
1,029	105,000	.00408	.00013	.....	.....	
1,078	110,000	.00437	.00029	.....	.....	
1,127	115,000	.00455	.00018	.....	.....	
1,176	120,000	.00478	.00023	.....	.....	
1,225	125,000	.00506	.00028	.....	.....	
1,274	130,000	.00531	.00025	.....	.....	
1,323	135,000	.00553	.00023	.....	.....	
1,372	140,000	.00588	.00035	.....	.....	
1,421	145,000	.00618	.00030	.....	.....	
1,470	150,000	.00653	.00035	.....	.....	Elastic limit.
1,519	155,000	.00700	.00047	.....	.....	
1,568	160,000	.00768	.00068	.....	.....	
1,617	165,000	.00885	.00117	.....	.....	
1,666	170,000	.01142	.00257	.....	.....	
1,715	175,000	.018	.00658	.....	.....	
1,764	180,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,000
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.015
Elongation per inch under strain at elastic limit	do...	.00653
Reduction in area after rupture, per centum of original section		37.5
Position of rupture		".80 outside the gauged section
Character of broken surface		fine, silky

No. 3802.

Sample 5.

Sectional area, ″.1002 × ″.1003 = .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	Initial load.
50	5,000	0.	0.	0.	0.	
200	20,000	.00070	.00070			
400	40,000	.00150	.00080			
600	60,000	.00228	.00078			
800	80,000	.00308	.00080			
1,000	100,000	.00390	.00082			
1,050	105,000	.00408	.00018			
1,100	110,000	.00430	.00022			
1,150	115,000	.00451	.00021			
1,200	120,000	.00480	.00029			
1,250	125,000	.00500	.00020			
1,300	130,000	.00528	.00028			
1,350	135,000	.00558	.00030			
1,400	140,000	.00583	.00025			
1,450	145,000	.00618	.00035			Elastic limit.
1,500	150,000	.00660	.00042			
1,550	155,000	.00711	.00051			
1,600	160,000	.00785	.00074			
1,650	165,000	.00911	.00126			
1,700	170,000	.01158	.00247			
1,750	175,000	.018	.00642			
1,800	180,000	.027	.009			
1,802	180,200					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,200
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.025
Elongation per inch under strain at elastic limit	do...	.00618
Reduction in area after rupture, per centum of original section		33.0
Position of rupture		″.80 inside the gauged section
Character of broken surface		fine, silky

No. 3803.

Sample 6.

Sectional area, ".0994×".0100=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00074	.00074			
396	40,000	.00151	.00077			
594	60,000	.00231	.00080			
792	80,000	.00313	.00082			
990	100,000	.00416	.00103			
1,039	105,000	.00426	.00010			
1,089	110,000	.00446	.00020			
1,138	115,000	.00480	.00034			
1,188	120,000	.00505	.00025			
1,237	125,000	.00541	.00036			
1,287	130,000	.00573	.00032			
1,336	135,000	.00608	.00035			Elastic limit.
1,386	140,000	.00650	.00042			
1,435	145,000	.00693	.00043			
1,485	150,000	.00750	.00057			
1,534	155,000	.00830	.00080			
1,584	160,000	.00906	.00076			
1,633	165,000	.01056	.00150			
1,683	170,000	.01500	.00444			
1,732	175,000	.02200	.007			
1,762	177,980					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	177,980
Elastic limit per square inch of original section	do...	135,000
Elongation per inch after rupture	inch..	.024
Elongation per inch under strain at elastic limit	do ..	.00608
Reduction in area after rupture, per centum of original section		32.3
Position of rupture	1".65 inside the gauged section	
Character of broken surface	fine, silky	

No. 3805.

Sample 9.

Sectional area, ".0996×".0995=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00072	.00072	.....	.....	
396	40,000	.00149	.00077	.....	.....	
594	60,000	.00224	.00075	.....	.....	
792	80,000	.00308	.00084	.....	.....	
990	100,000	.00395	.00087	.....	.....	
1,039	105,000	.00413	.00018	.....	.....	
1,089	110,000	.00436	.00023	.....	.....	
1,138	115,000	.00467	.00031	.....	.....	
1,188	120,000	.00487	.00020	.....	.....	
1,237	125,000	.00514	.00027	.....	.....	
1,287	130,000	.00544	.00030	.....	.....	
1,336	135,000	.00571	.00027	.....	.....	
1,386	140,000	.00602	.00031	.....	.....	Elastic limit.
1,435	145,000	.00642	.00040	.....	.....	
1,485	150,000	.00686	.00044	.....	.....	
1,534	155,000	.00738	.00052	.....	.....	
1,584	160,000	.00818	.00080	.....	.....	
1,633	165,000	.00933	.00115	.....	.....	
1,683	170,000	.012	.00267	.....	.....	
1,732	175,000	.017	.005	.....	.....	
1,780	179,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	179,800
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00602
Reduction in area after rupture, per centum of original section		25.3
Position of rupture		3."95 outside the gauged section
Character of broken surface		fine, silky

.1-INCH SQUARE TINNED STEEL WIRE.

No. 3997.

Mark, No. 15.
Sectional area, ".1002×".1001=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00070	.00070			
400	40,000	.00143	.00073			
600	60,000	.00236	.00093			
800	80,000	.00300	.00064			
1,000	100,000	.00398	.00098			
1,200	120,000	.00491	.00093			
1,250	125,000	.00510	.00019			
1,300	130,000	.00537	.00027			
1,350	135,000	.00567	.00030			
1,400	140,000	.00605	.00038			
1,450	145,000	.00638	.00033			Elastic limit.
1,500	150,000	.00685	.00047			
1,550	155,000	.00735	.00050			
1,600	160,000	.00804	.00069			
1,650	165,000	.00890	.00086			
1,700	170,000	.01061	.00171			
1,750	175,000	.016	.00539			
1,800	180,000	.030	.014			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,000
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.624
Elongation per inch under strain at elastic limit	do...	.00638
Reduction in area after rupture, per centum of original section		42.0
Position of rupture		at end of gauged section
Character of broken surface		fine, silky

No. 3998.

Mark, No. 20.
Sectional area, ″.0994×″.0995=.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00069	.00069	.....	.....	
396	40,000	.00142	.00073	.....	.....	
594	60,000	.00221	.00079	.....	.....	
792	80,000	.00297	.00076	.....	.....	
990	100,000	.00381	.00084	.....	.....	
1,188	120,000	.00467	.00086	.....	.....	
1,287	125,000	.00482	.00015	.....	.....	
1,287	130,000	.00503	.00021	.....	.....	
1,336	135,000	.00530	.00027	.....	.....	
1,386	140,000	.00555	.00025	.....	.....	
1,436	145,000	.00581	.00026	.....	.....	
1,485	150,000	.00610	.00029	.....	.....	
1,535	155,000	.00647	.00037	.....	.....	
1,584	160,000	.00678	.00031	.....	.....	Elastic limit.
1,634	165,000	.00731	.00053	.....	.....	
1,683	170,000	.00790	.00059	.....	.....	
1,733	175,000	.00932	.00142	.....	.....	
1,782	180,000	.01160	.00228	.....	.....	
1,832	185,000	.022	.0104	.....	.....	
1,866	188,690	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	188,690
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch...	.027
Elongation per inch under strain at elastic limit	do...	.00678
Reduction in area after rupture, per centum of original section		43.4
Position of rupture		2″.8 inside the gauged section
Character of broken surface		fine, silky

No. 3999.

5.

ea, ″.0992×″.0996=″.0099 square inch.

gth, 10″.

uare i.	Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
ds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
000	0.	0.	0.	0.	Initial load.
000	.00676	.00076	.....	.....	
000	.00150	.00074	.....	.....	
000	.00234	.00084	.....	.....	
000	.00319	.00085	.....	.....	
000	.00414	.00095	.....	.....	
000	.00524	.00110	.....	.....	
000	.00554	.00030	.....	.....	
000	.00586	.00032	.....	.....	Elastic limit.
000	.00629	.00043	.....	.....	
000	.00679	.00050	.....	.....	
000	.00739	.00060	.....	.....	
000	.00811	.00072	.....	.....	
000	.00912	.00101	.....	.....	
000	.01100	.00188	.....	.....	
000	.016	.005	.....	.....	
490	.....	.....	.....	.....	Tensile strength.

General summary.

square inch of original section	pounds..	169,490
are inch of original section	do...	130,000
after rupture	inch..	.010
under strain at elastic limit	do...	.00586
ter rupture, per centum of original section		41.4
	3″.45 outside the gauged section	
surface		fine, silky

No. 4000.

Mark, No. 30.
Sectional area, ".0992×".0993=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00074	.00074			
392	40,000	.00156	.00082			
588	60,000	.00234	.00078			
784	80,000	.00317	.00083			
980	100,000	.00421	.00104			
1,176	120,000	.00544	.00123			
1,225	125,000	.00576	.00032			Elastic limit.
1,274	130,000	.00623	.00047			
1,323	135,000	.00678	.00055			
1,372	140,000	.00743	.00065			
1,421	145,000	.00848	.00105			
1,470	150,000	.00973				
1,519	155,000	.01316				
1,568	160,000	.023				
1,586	161,840					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	161,840
Elastic limit per square inch of original section	do	125,000
Elongation per inch after rupture	inch	.017
Elongation per inch under strain at elastic limit	do	.00576
Reduction in area after rupture, per centum of original section		40.8
Position of rupture		".25 outside the gauged section
Character of broken surface		fine, silky

No. 4001.

Mark, No. 35.
Sectional area, .″0992×″.0993=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00078	.00078	.....	.....	
392	40,000	.00157	.00079	.....	.....	
588	60,000	.00227	.00070	.....	.....	
787	80,000	.00302	.00075	.....	.....	
980	100,000	.00387	.00085	.....	.....	
1,176	120,000	.00480	.00093	.....	.....	
1,225	125,000	.00498	.00018	.....	.....	
1,274	130,000	.00517	.00019	.....	.....	
1,323	135,000	.00547	.00030	.....	.....	
1,372	140,000	.00562	.00015	.....	.....	
1,421	145,000	.00598	.00036	.....	.....	
1,470	150,000	.00638	.00040	.....	.....	
1,519	155,000	.00679	.00041	.....	.....	Elastic limit.
1,568	160,000	.00728	.00051	.....	.....	
1,617	165,000	.00799	.00071	.....	.....	
1,666	170,000	.00900	.00101	.....	.....	
1,715	175,000	.01170	.00270	.....	.....	
1,754	180,000	.017	.0053	.....	.....	
1,816	185,310	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	185,310
Elastic limit per square inch of original section	do...	155,000
Elongation per inch after rupture	inch..	.025
Elongation per inch under strain at elastic limit	do...	.00679
Reduction in area after rupture, per centum of original section	do...	34.7
Position of rupture		4″. inside the gauged section
Character of broken surface		fine, silky

No. 4002.

Marks, No. 40.
Sectional area, ".1002×".1005=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00080	.00080	.....	.....	
400	40,000	.00160	.00080	.....	.....	
600	60,000	.00235	.00075	.....	.....	
800	80,000	.00310	.00075	.....	.....	
1,000	100,000	.00410	.00100	.....	.....	
1,200	120,000	.00515	.00105	.....	.....	
1,250	125,000	.00537	.00022	.....	.....	
1,300	130,000	.00565	.00028	.....	.....	
1,350	135,000	.00598	.00033	.....	.....	
1,400	140,000	.00637	.00039	.....	.....	
1,450	145,000	.00679	.00042	.....	.....	Elastic limit.
1,500	150,000	.00728	.00049	.....	.....	
1,550	155,000	.00795	.00067	.....	.....	
1,600	160,000	.00900	.00105	.....	.....	
1,650	165,000	.01040	.00140	.....	.....	
1,700	170,000	.015	.0046	.....	.....	
1,750	175,000	.022	.007	.....	.....	
1,760	176,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	176,000
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.024
Elongation per inch under strain at elastic limit	do...	.00679
Reduction in area after rupture, per centum of original section		33.0
Position of rupture		1".6 inside the gauged section
Character of broken surface		fine silky

No. 4003.

Marks, No. 45.
Sectional area, ″.0988×″.0987= .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00075	.00075	.....	.....	
392	40,000	.00150	.00075	.....	.....	
588	60,000	.00219	.00069	.....	.....	
784	80,000	.00304	.00085	.....	.....	
980	100,000	.00399	.00095	.....	.....	
1,176	120,000	.00474	.00075	.....	.....	
1,225	125,000	.00490	.00016	.....	.....	
1,274	130,000	.00519	.00029	.....	.....	
1,323	135,000	.00540	.00021	.....	.....	
1,372	140,000	.00572	.00032	.....	.....	
1,421	145,000	.00606	.00034	.....	.....	
1,470	150,000	.00644	.00038	.....	.....	Elastic limit.
1,519	155,000	.00694	.00050	.....	.....	
1,568	160,000	.00749	.00055	.....	.....	
1,617	165,000	.00813	.00064	.....	.....	
1,666	170,000	01280	.00467	.....	.....	
1,715	175,000	.021	.0083	.....	.....	
1,744	177,980	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	177,980
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit	do ..	.00644
Reduction in area after rupture, per centum of original section		36.7
Position of rupture		1″.75 inside the gauged section
Character of broken surface		fine silky

No. 4004.

Marks, No. 50.
Sectional area, ″.0983 × ″.0985 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00079	.00079			
388	40,000	.00151	.00072			
582	60,000	.00233	.00082			
776	80,000	.00318	.00085			
970	100,000	.00423	.00105			
1,164	120,000	.00540	.00117			
1,212	125,000	.00568	.00028			
1,261	130,000	.00613	.00035			
1,309	135,000	.00653	.00050			
1,358	140,000	.00687	.00034			Elastic limit.
1,406	145,000	.00752	.00065			
1,455	150,000	.00817	.00065			
1,503	155,000	.00903	.00086			
1,552	160,000	.01020	.00117			
1,600	165,000	.012	.0018			
1,649	170,000	.017	.005			
1,683	173,510					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	173,510
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00687
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		1″.7 inside the gauged section
Character of broken surface		fine silky

No. 4005.

Marks, No. 55.
Sectional area, ″.0984 × ″.0986 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00072	.00072			
388	40,000	.00141	.00069			
582	60,000	.00221	.00080			
776	80,000	.00302	.00081			
970	100,000	.00392	.00090			
1,164	120,000	.00495	.00103			
1,212	125,000	.00518	.00023			
1,261	130,000	.00543	.00025			
1,309	135,000	.00589	.00046			
1,358	140,000	.00622	.00033			Elastic limit.
1,406	145,000	.00674	.00052			
1,455	150,000	.00761	.00087			
1,503	155,000	.00898	.00137			
1,552	160,000	.01215	.00317			
1,590	163,920					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	163,920
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.008
Elongation per inch under strain at elastic limit	do....	.00622
Reduction in area after rupture, per centum of original section		34.0
Position of rupture	in jaws of machine, outside guaged section	
Character of broken surface	fine silky	

No. 4006.

Marks, No. 60.
Sectional area, ″.0992 × ″.0994 = .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00082	.00082	.....	.....	
392	40,000	.00154	.00072	.....	.....	
588	60,000	.00232	.00078	.....	.....	
784	80,000	.00314	.00082	.....	.....	
980	100,000	.00412	.00098	.....	.....	
1,176	120,000	.00519	.00107	.....	.....	
1,225	125,000	.00544	.00025	.....	.....	
1,274	130,000	.00578	.00034	.....	.....	
1,323	135,000	.00618	.00040	.....	.....	Elastic limit.
1,372	140,000	.00668	.00050	.....	.....	
1,421	145,000	.00728	.00060	.....	.....	
1,470	150,000	.00828	.00100	.....	.....	
1,519	155,000	.00969	.00141	.....	.....	
1,568	160,000	.01262	.00293	.....	.....	
1,617	165,000	.021	.00838	.....	.....	
1,647	168,060	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,060
Elastic limit per square inch of original section	do...	135,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00618
Reduction in area after rupture, per centum of original section		29.5
Position of rupture		1″.75 outside the gauged section
Character of broken surface		fine silky

No. 4007.

Marks, No. 65.
Sectional area, ″.0990×″.0993=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00080	.00080	.....	.....	
392	40,000	.00157	.00077	.....	.....	
588	60,000	.00235	.00078	.....	.....	
784	80,000	.00315	.00080	.....	.....	
980	100,000	.00405	.00090	.....	.....	
1,176	120,000	.00504	.00099	.....	.....	
1,225	125,000	.00529	.00025	.....	.....	
1,274	130,000	.00555	.00026	.....	.....	
1,323	135,000	.00592	.00037	.....	.....	
1,372	140,000	.00625	.00033	.....	.....	
1,421	145,000	.00665	.00040	.....	.....	Elastic limit.
1,470	150,000	.00713	.00048	.....	.....	
1,519	155,000	.00769	.00056	.....	.....	
1,568	160,000	.00876	.00107	.....	.....	
1,617	165,000	.01072	.00196	.....	.....	
1,666	170,000	.016	.00528	.....	.....	
1,714	174,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,900
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.015
Elongation per inch under strain at elastic limit	do...	.00665
Reduction in area after rupture, per centum of original section		24.7
Position of rupture		at end of gauged section
Character of broken surface		fine silky

No. 4008.

Marks, No. 70.
Sectional area, ″.0985×″.0994=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00078	.00078	.....	.....	
392	40,000	.00148	.00070	.....	.....	
588	60,000	.00218	.00070	.....	.....	
784	80,000	.00298	.00080	.....	.....	
980	100,000	.00380	.00082	.....	.....	
1,176	120,000	.00468	.00088	.....	.....	
1,225	125,000	.00488	.00020	.....	.....	
1,274	130,000	.00513	.00025	.....	.....	
1,323	135,000	.00538	.00025	.....	.....	
1,372	140,000	.00568	.00030	.....	.....	
1,421	145,000	.00603	.00035	.....	.....	
1,470	150,000	.00641	.00038	.....	.....	Elastic limit.
1,519	155,000	.00710	.00069	.....	.....	
1,568	160,000	.00851	.00141	.....	.....	
1,617	165,000	.01535	.00684	.....	.....	
1,666	170,000	.026	.01065	.....	.....	
1,684	171,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	171,840
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.018
Elongation per inch under strain at elastic limit	do...	.00641
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		1″.87 outside the gauged section
Character of broken surface		fine silky

No. 4009.

Marks, No. 75.
Sectional area, ″.0990 × ″.0986 = .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00080	.00080	.....	.....	
392	40,000	.00157	.00077	.....	.....	
588	60,000	.00234	.00077	.....	.....	
784	80,000	.00321	.00087	.....	.....	
980	100,000	.00408	.00087	.....	.....	
1,176	120,000	.00508	.00100	.....	.....	
1,225	125,000	.00528	.00020	.....	.....	
1,274	130,000	.00551	.00023	.....	.....	
1,323	135,000	.00588	.00027	.....	.....	
1,372	140,000	.00618	.00030	.....	.....	
1,421	145,000	.00658	.00040	.....	.....	
1,470	150,000	.00693	.00035	.....	.....	Elastic limit.
1,519	155,000	.00750	.00057	.....	.....	
1,568	160,000	.00815	.00065	.....	.....	
1,617	165,000	.00896	.00081	.....	.....	
1,666	170,000	.01047	.00151	.....	.....	
1,715	175,000	.016	.00553	.....	.....	
1,764	180,000	.021	.005	.....	.....	
1,790	182,650	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	182,650
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00693
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		3″.25 inside the gauged section
Character of broken surface		fine silky

No. 4010.

Marks, No. 80.
Sectional area, ″.0990 × ″.0993 = .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00083	.00082	.....	.....	
392	40,000	.00162	.00080	.....	.....	
588	60,000	.00240	.00078	.....	.....	
784	80,000	.00330	.00090	.....	.....	
980	100,000	.00424	.00094	.....	.....	
1,176	120,000	.00528	.00104	.....	.....	
1,225	125,000	.00552	.00024	.....	.....	
1,274	130,000	.00587	.00035	.....	.....	
1,323	135,000	.00622	.00035	.....	.....	
1,372	140,000	.00660	.00038	.....	.....	Elastic limit.
1,421	145,000	.00708	.00048	.....	.....	
1,470	150,000	.00758	.00050	.....	.....	
1,519	155,000	.00831	.00073	.....	.....	
1,568	160,000	.00922	.00091	.....	.....	
1,617	165,000	.01082	.00160	.....	.....	
1,666	170,000	.016	.00518	.....	.....	
1,715	175,000	.021	.005	.....	.....	
1,746	178,260	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	178,260
Elastic limit per square inch of original section	do ..	140,000
Elongation per inch after rupture	inch..	0.016
Elongation per inch under strain at elastic limit	do...	.00660
Reduction in area after rupture, per centum of original section		36.7
Position of rupture		2″.25 outside the gauged section
Character of broken surface		fine silky

No. 4011.

Marks, No. 85.
Sectional area, ″.0995 × ″.0992 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.			Initial load.
198	20,000	.00078	.00078			
396	40,000	.00158	.00080			
594	60,000	.00240	.00082			
792	80,000	.00315	.00075			
990	100,000	.00399	.00084			
1,188	120,000	.00488	.00089			
1,237	125,000	.00510	.00022			
1,287	130,000	.00540	.00030			
1,336	135,000	.00567	.00027			
1,386	140,000	.00592	.00025			
1,436	145,000	.00628	.00036			
1,485	150,000	.00667	.00039			Elastic limit.
1,535	155,000	.00717	.00050			
1,584	160,000	.00774	.00057			
1,634	165,000	.00872	.00098			
1,683	170,000	.01141	.00269			
1,732	174,950	.022	.01059			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,950
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00667
Reduction in area after rupture, per centum of original section		43.4
Position of rupture		″.25 outside the gauged section
Character of broken surface		fine silky

No. 4012.

Marks, No. 90.
Sectional area, ″.0982 × ″.0983 = .0096 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
192	20,000	.00072	.00072	.....	.....	
384	40,000	.00142	.00070	.....	.....	
576	60,000	.00220	.00078	.....	.....	
768	80,000	.00300	.00080	.....	.....	
960	100,000	.00387	.00087	.....	.....	
1,152	120,000	.00490	.00103	.....	.....	
1,200	125,000	.00510	.00020	.....	.....	
1,248	130,000	.00546	.00036	.....	.....	
1,296	135,000	.00590	.00044	.....	.....	
1,344	140,000	.00625	.00035	.....	.....	Elastic limit.
1,392	145,000	.00673	.00048	.....	.....	
1,440	150,000	.00740	.00067	.....	.....	
1,488	155,000	.00820	.00080	.....	.....	
1,536	160,000	.00992	.00172	.....	.....	
1,584	165,000	.01244	.00252	.....	.....	
1,632	170,000	.027	.01456	.....	.....	
1,650	171,875	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	171,875
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit	do...	.00625
Reduction in area after rupture, per centum of original section		33.3
Position of rupture		″.07 inside the gauged section
Character of broken surface		fine silky

No. 4013.

Marks, No. 100.
Sectional area, ″.0986 × ″.0993 = .0008 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00080	.00080	.....	.....	
392	40,000	.00159	.00079	.....	.....	
588	60,000	.00234	.00075	.....	.....	
784	80,000	.00314	.00080	.....	.....	
980	100,000	.00397	.00083	.....	.....	
1,176	120,000	.00493	.00096	.....	.....	
1,225	125,000	.00517	.00024	.....	.....	
1,274	130,000	.00549	.00032	.....	.....	
1,323	135,000	.00580	.00031	.....	.....	
1,372	140,000	.00615	.00035	.....	.....	Elastic limit.
1,421	145,000	.00675	.00060	.....	.....	
1,470	150,000	.00725	.00050	.....	.....	
1,519	155,000	.00845	.00120	.....	.....	
1,568	160,000	.01251	.00406	.....	.....	
1,617	165,000	.023	.01049	.....	.....	
1,651	168,470	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,470
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00615
Reduction in area after rupture, per centum of original section		31.6
Position of rupture		4″.65 outside the gauged section
Character of broken surface		fine silky

No. 4014.

Marks, No. 110.
Sectional area, ″.0988 × ″.0990 = .0098 square inch.
Gauged length, 10′.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00068	.00068	.....	.....	
392	40,000	.00148	.00080	.....	.....	
588	60,000	.00218	.00070	.....	.....	
784	80,000	.00293	.00075	.....	.....	
980	100,000	.00379	.00086	.....	.....	
1,176	120,000	.00478	.00099	.....	.....	
1,225	125,000	.00496	.00018	.....	.....	
1,274	130,000	.00520	.00024	.....	.....	
1,323	135,000	.00551	.00031	.....	.....	
1,372	140,000	.00588	.00037	.....	.....	
1,421	145,000	.00628	.00040	.....	.....	Elastic limit.
1,470	150,000	.00673	.00045	.....	.....	
1,519	155,000	.00755	.00082	.....	.....	
1,568	160,000	.00860	.00105	.....	.....	
1,617	165,000	.01183	.00323	.....	.....	
1,666	170,000	.027	.01517	.....	.....	
1,682	171,630	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	171,630
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.029
Elongation per inch under strain at elastic limit	do...	.00628
Reduction in area after rupture, per centum of original section		40.8
Position of rupture		3″.75 inside the gauged section
Character of broken surface		fine silky

No. 4015.

Marks, No. 125.
Sectional area, ″.0994 × ″.0994 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00072	.00072			
396	40,000	.00144	.00072			
594	60,000	.00229	.00085			
792	80,000	.00309	.00080			
990	100,000	.00392	.00083			
1,188	120,000	.00492	.00101			
1,237	125,000	.00512	.00019			
1,287	130,000	.00542	.00030			
1,336	135,000	.00574	.00032			
1,386	140,000	.00615	.00041			Elastic limit.
1,436	145,000	.00659	.00044			
1,485	150,000	.00722	.00063			
1,535	155,000	.00830	.00108			
1,584	160,000	.01154	.00324			
1,628	164,440					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	164,440
Elastic limit per square inch of original section	do...	140,090
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00615
Reduction in area after rupture, per centum of original section		33.3
Position of rupture	2″.95 outside the gauged section	
Character of broken surface		fine silky

No. 4016.

Marks, No. 130.
Sectional area, ″.0984 × ″.0991 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00072	.00072			
388	40,000	.00142	.00070			
582	60,000	.00220	.00078			
776	80,000	.00298	.00078			
970	100,000	.00376	.00088			
1,164	120,000	.00468	.00090			
1,212	125,000	.00487	.00019			
1,261	130,000	.00511	.00024			
1,309	135,000	.00538	.00027			
1,358	140,000	.00568	.00030			
1,406	145,000	.00599	.00031			
1,455	150,000	.00634	.00035			
1,503	155,000	.00672	.00038			
1,552	160,000	.00713	.00041			Elastic limit.
1,600	165,000	.00763	.00050			
1,649	170,000	.00840	.00077			
1,697	175,000	.00965	.00125			
1,746	180,000	.015	.00535			
1,794	185,000	.020	.005			
1,816	187,220					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	187,220
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00713
Reduction in area after rupture, per centum of original section		48.5
Position of rupture		2″.8 inside the gauged section
Character of broken surface		fine silky

No. 4017.

Marks, No. 135.
Sectional area, ″.0986 × ″.0984 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00078	.00078	.....	.....	
388	40,000	.00155	.00077	.....	.....	
582	60,000	.00231	.00076	.....	.....	
776	80,000	.00322	.00091	.....	.....	
970	100,000	.00417	.00095	.....	.....	
1,164	120,000	.00517	.00100	.....	.....	
1,212	125,000	.00538	.00021	.....	.....	
1,261	130,000	.00560	.00022	.....	.....	
1,309	135,000	.00602	.00043	.....	.....	
1,358	140,000	.00638	.00035	.....	.....	
1,406	145,000	.00678	.00040	.....	.....	
1,455	150,000	.00715	.00037	.....	.....	Elastic limit.
1,503	155,000	.00778	.00063	.....	.....	
1,552	160,000	.00845	.00067	.....	.....	
1,600	165,000	.00932	.00087	.....	.....	
1,649	170,000	.01078	.00146	.....	.....	
1,697	175,000	.016	.00522	.....	.....	
1,742	179,590	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	179,590
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00715
Reduction in area after rupture, per centum of original section		32.0
Position of rupture	4″.15 inside the gauged section	
Character of broken surface		fine silky

No. 4018.

Marks, No. 140.
Sectional area, ″.0076×″.0985=.0096 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
192	20,000	.00071	.00071	.....	.....	
384	40,000	.00163	.00092	.....	.....	
576	60,000	.00250	.00087	.....	.....	
768	80,000	.00328	.00078	.....	.....	
960	100,000	.00418	.00090	.....	.....	
1,152	120,000	.00523	.00105	.....	.....	
1,200	125,000	.00542	.00019	.....	.....	
1,248	130,000	.00577	.00035	.....	.....	
1,296	135,000	.00608	.00031	.....	.....	
1,344	140,000	.00648	.00040	.....	.....	
1,392	145,000	.00688	.00040	.....	.....	Elastic limit.
1,440	150,000	.00758	.00070	.....	.....	
1,488	155,000	.00840	.00082	.....	.....	
1,536	160,000	.00970	.00130	.....	.....	
1,584	165,000	.01368	.00398	.....	.....	
1,616	168,330	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,330
Elastic limit, per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do ..	.00688
Reduction in area after rupture, per centum of original section		33.3
Position of rupture		3″.5 inside of gauged section
Character of broken surface		fine, silky

No. 4019.

Marks, No. 145.
Sectional area, ".0986 × ".0987 = .0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00085	.00025	.....	.....	
388	40,000	.00157	.00072	.....	.....	
582	60,000	.00238	.00081	.....	.....	
776	80,000	.00320	.00082	.....	.....	
970	100,000	.00410	.00090	.....	.....	
1,164	120,000	.00503	.00093	.....	.....	
1,212	125,000	.00528	.00025	.....	.....	
1,261	130,000	.00550	.00022	.....	.....	
1,309	135,000	.00582	.00032	.....	.....	
1,358	140,000	.00617	.00035	.....	.....	
1,404	145,000	.00663	.00046	.....	.....	
1,455	150,000	.00702	.00039	.....	.....	Elastic limit.
1,503	155,000	.00765	.00063	.....	.....	
1,552	160,000	.00823	.00058	.....	.....	
1,600	165,000	.00940	.00117	.....	.....	
1,649	170,000	.01140	.00200	.....	.....	
1,697	175,000	.017	.00560	.....	.....	
1,738	179,180	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	179,180
Elastic limit per square inch of original section	do ..	150,000
Elongation per inch after rupture	inch..	.025
Elongation per inch under strain at elastic limit	do...	.00702
Reduction in area after rupture, per centum of original section		42.3
Position of rupture		2".1 inside the gauged section
Character of broken surface		fine, silky

No. 4020.

Marks, No. 150.
Sectional area, ".0987×."0986=."0097 square inch.
Ganged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00080	.00080			
388	40,000	.00152	.00072			
582	60,000	.00233	.00081			
776	80,000	.00315	.00082			
970	100,000	.00413	.00098			
1,164	120,000	.00516	.00103			
1,212	125,000	.00545	.00029			
1,261	130,000	.00576	.00031			
1,309	135,000	.00613	.00037			Elastic limit.
1,358	140,000	.00656	.00043			
1,406	145,000	.00718	.00062			
1,455	150,000	.00775	.00057			
1,503	155,000	.00873	.00098			
1,552	160,000	.01037	.00164			
1,600	165,000	.013	.00263			
1,649	170,000	.023	.010			
1,682	173,400					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	173,400
Elastic limit per square inch of original section	do...	135,000
Elongation per inch after rupture	inch..	0.020
Elongation per inch under strain at elastic limit	do...	.00613
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		2".5 inside the ganged section
Character of broken surface		fine silky

No. 4021.

Marks, No. 155.
Sectional area, ″.0990×″.0990=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00078	.00078	.....	.....	
392	40,000	.00168	.00090	.....	.....	
588	60,000	.00247	.00079	.....	.....	
784	80,000	.00330	.00083	.....	.....	
980	100,000	.00428	.00098	.....	.....	
1,176	120,000	.00533	.00105	.....	.....	
1,225	125,000	.00552	.00019	.....	.....	
1,274	130,000	.00591	.00039	.....	.....	
1,323	135,000	.00628	.00037	.....	.....	
1,372	140,000	.00667	.00039	.....	.....	Elastic limit.
1,421	145,000	.00717	.00050	.....	.....	
1,470	150,000	.00772	.00055	.....	.....	
1,519	155,000	.00845	.00073	.....	.....	
1,568	160,000	.00933	.00088	.....	.....	
1,617	165,000	.01088	.00155	.....	.....	
1,666	170,000	.014	.00312	.....	.....	
1,715	175,000	.020	.006	.....	.....	
1,746	178,160	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	178,160
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.038
Elongation per inch under strain at elastic limit	do...	.00667
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		2″.75 inside the gauged section
Character of broken surface		fine silky

No. 4022.

Marks, No. 165.
Sectional area, ″.0983×″.0986=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00079	.00079			
388	40,000	.00155	.00076			
582	60,000	.00234	.00079			
776	80,000	.00312	.00078			
970	100,000	.00333	.00021			
1,164	120,000	.00470	.00137			
1,212	125,000	.00497	.00027			
1,261	130,000	.00528	.00031			
1,309	135,000	.00557	.00029			
1,358	140,000	.00591	.00034			Elastic limit.
1,406	145,000	.00634	.00043			
1,455	150,000	.00678	.00044			
1,503	155,000	.00778	.00100			
1,552	160,000	.01003	.00225			
1,594	164,330					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	164,330
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.067
Elongation per inch under strain at elastic limit	do...	.00591
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		in jaws of machine outside gauged section
Character of broken surface		fine silky

No. 4023.

Marks, No. 170.
Sectional area, ″.0986×″.0987=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00079	.00079	.....	.....	
388	40,000	.00162	.00083	.....	.....	
582	60,000	.00247	.00085	.....	.....	
776	80,000	.00327	.00080	.....	.....	
970	100,000	.00410	.00083	.....	.....	
1,164	120,000	.00503	.00093	.....	.....	
1,212	125,000	.00530	.00027	.....	.....	
1,261	130,000	.00553	.00023	.....	.....	
1,309	135,000	.00587	.00034	.....	.....	
1,358	140,000	.00617	.00030	.....	.....	
1,406	145,000	.00650	.00033	.....	.....	Elastic limit.
1,455	150,000	.00702	.00052	.....	.....	
1,503	155,000	.00750	.00048	.....	.....	
1,552	160,000	.00813	.00063	.....	.....	
1,600	165,000	.00911	.00098	.....	.....	
1,649	170,000	.01095	.00184	.....	.....	
1,697	175,000	.018	.00705	.....	.....	
1,718	177,110	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	177,110
Elastic limit per square inch of original section	do	145,000
Elongation per inch after rupture	inch	.010
Elongation per inch under strain at elastic limit	do	.00650
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		3″.5 outside the gauged section
Character of broken surface		fine silky

No. 4024.

Marks, No. 175.
Sectional area, ″0984×″.0985=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00077	.00077	.....	.....	
388	40,000	.00155	.00078	.....	.....	
882	60,000	.00235	.00080	.....	.....	
776	80,000	.00315	.00080	.....	.....	
970	100,000	.00413	.00096	.....	.....	
1,164	120,000	.00513	.00100	.....	.....	
1,212	125,000	.00540	.00027	.....	.....	
1,261	130,000	.00570	.00030	.....	.....	
1,309	135,000	.00609	.00039	.....	.....	
1,358	140,000	.00645	.00036	.....	.....	Elastic limit.
1,406	145,000	.00693	.00048	.....	.....	
1,455	150,000	.00747	.00054	.....	.....	
1,503	155,000	.00813	.00066	.....	.....	
1,552	160,000	.00915	.00102	.....	.....	
1,600	165,000	.01067	.00152	.....	.....	
1,649	170,000	.016	.00533	.....	.....	
1,697	175,000	.028	.012	.....	.....	
1,700	175,260	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	175,260
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.014
Elongation per inch under strain at elastic limit	do...	.00645
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		0″.2 outside of the gauged section
Character of broken surface		fine silky

No. 4025.

Marks, No. 180.
Sectional area, ″.0986×″.0988=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00087	.00087	.....	.....	
388	40,000	.00159	.00072	.....	.....	
582	60,000	.00238	.00079	.....	.....	
776	80,000	.00316	.00078	.....	.....	
970	100,000	.00408	.00092	.....	.....	
1,164	120,000	.00497	.00089	.....	.....	
1,212	125,000	.00518	.00021	.....	.....	
1,261	130,000	.00547	.00029	.....	.....	
1,309	135,000	.00577	.00030	.....	.....	
1,358	140,000	.00617	.00040	.....	.....	
1,406	145,000	.00652	.00035	.....	.....	Elastic limit.
1,455	150,000	.00698	.00046	.....	.....	
1,503	155,000	.00752	.00054	.....	.....	
1,552	160,000	.00837	.00085	.....	.....	
1,600	165,000	.01008	.00171	.....	.....	
1,649	170,000	.017	.00692	.....	.....	
1,696	174,850	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,850
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.622
Elongation per inch under strain at elastic limit	do...	.00652
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		″.55 inside the gauged section
Character of broken surface		fine silky

No. 4026.

Marks, No. 185.
Sectional area, ″.0984×″.0988=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5 000	0.	0.	0.	0.	Initial load.
194	20, 000	.00082	.00082			
388	40, 000	.00165	.00083			
582	60, 000	.00247	.00082			
776	80, 000	.00331	.00084			
970	100, 000	.00422	.00091			
1, 164	120, 000	.00523	.00101			
1, 212	125, 000	.00547	.00024			
1, 261	130, 000	.00577	.00030			
1, 309	135, 000	.00618	.00041			
1, 358	140, 000	.00658	.00040			Elastic limit.
1, 406	145, 000	.00708	.00050			
1, 455	150, 000	.00772	.00064			
1, 503	155, 000	.00862	.00090			
1, 552	160, 000	.01002	.00140			
1, 600	165, 000	.011	.00098			
1, 649	170, 000	.020	.009			
1, 694	174, 640					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	174, 640
Elastic limit per square inch of original section	do	140, 000
Elongation per inch after rupture	inch	.024
Elongation per inch under strain at elastic limit	do	.00658
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		2″.8 inside the gauged section
Character of broken surface		fine silky

No. 4027.

Marks, No. 190.
Sectional area, ″.0987×″.0984=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00080	.00080	.....	.....	
388	40,000	.00158	.00078	.....	.....	
582	60,000	.00238	.00080	.....	.....	
776	80,000	.00338	.00100	.....	.....	
970	100,000	.00440	.00102	.....	.....	
1,164	120,000	.00580	.00140	.....	.....	
1,212	125,000	.00613	.00033	.....	.....	Elastic limit.
1,261	130,000	.00660	.00047	.....	.....	
1,309	135,000	.00733	.00073	.....	.....	
1,358	140,000	.00798	.00065	.....	.....	
1,406	145,000	.00925	.00127	.....	.....	
1,445	150,000	.01040	.00115	.....	.....	
1,503	155,000	.013	.00260	.....	.....	
1,552	160,000	.018	.005	.....	.....	
1,576	162,470	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	162,470
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.013
Elongation per inch under strain at elastic limit	do...	.00613
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		2″.95 outside the gauged section
Characture of broken surface		fine silky

No. 4029.

Marks, No. 205.
Sectional area, ".0991×".0993=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00078	.00078	.....	.....	
392	40,000	.00156	.00072	.....	.....	
588	60,000	.00213	.00063	.....	.....	
784	80,000	.00308	.00095	.....	.....	
980	100,000	.00391	.00083	.....	.....	
1,176	120,000	.00480	.00089	.....	.....	
1,225	125,000	.00502	.00022	.....	.....	
1,274	130,000	.00529	.00027	.....	.....	
1,323	135,000	.00557	.00028	.....	.....	
1,372	140,000	.00584	.00027	.....	.....	
1,421	145,000	.00618	.00034	.....	.....	
1,470	150,000	.00650	.00032	.....	.....	
1,519	155,000	.00692	.00042	.....	.....	
1,568	160,000	.00728	.00036	.....	.....	Elastic limit.
1,617	165,000	.00789	.00061	.....	.....	
1,666	170,000	.00862	.00073	.....	.....	
1,715	175,000	.00990	.00128	.....	.....	
1,764	180,000	.01240	.00250	.....	.....	
1,813	185,000	.021	.00860	.....	.....	
1,832	186,940	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	186,940
Elastic limit per square inch of original section	do...	160,[illegible]0
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00728
Reduction in area after rupture, per centum of original section		40.8
Position of rupture		".7 inside the gauged section
Character of broken surface		fine silky

No. 4030.

Marks, No. 210.
Sectional area, ″.0984×″.0985=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00081	.00081	.....	.....	
388	40,000	.00151	.00070	.....	.....	
582	60,000	.00230	.00079	.....	.....	
776	80,000	.00312	.00082	.....	.....	
970	100,000	.00398	.00086	.....	.....	
1,164	120,000	.00499	.00101	.....	.....	
1,212	125,000	.00521	.00022	.....	.....	
1,261	130,000	.00549	.00028	.....	.....	
1,309	135,000	.00586	.00037	.....	.....	
1,358	140,000	.00625	.00039	.....	.....	Elastic limit.
1,406	145,000	.00670	.00045	.....	.....	
1,455	150,000	.00720	.00050	.....	.....	
1,503	155,000	.00790	.00070	.....	.....	
1,552	160,000	.00877	.00087	.....	.....	
1,600	165,000	.01082	.00205	.....	.....	
1,649	170,000	.016	.00518	.....	.....	
1,692	174,430	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,430
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00625
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		5″.25 outside the gauged section
Character of broken surface		fine silky

No. 4031.

Marks, No. 215.
Sectional area, ″.0984 × ″.0988 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00080	.00080	.....	.....	
388	40,000	.00157	.00077	.....	.....	
582	60,000	.00240	.00083	.....	.....	
776	80,000	.00330	.00090	.....	.....	
970	100,000	.00430	.00100	.....	.....	
1,164	120,000	.00567	.00137	.....	.....	
1,212	125,000	.00590	.00023	.....	.....	Elastic limit.
1,261	130,000	.00635	.00045	.....	.....	
1,309	135,000	.00680	.00045	.....	.....	
1,358	140,000	.00742	.00062	.....	.....	
1,406	145,000	.00818	.00076	.....	.....	
1,455	150,000	.00918	.00100	.....	.....	
1,503	155,000	.01060	.00142	.....	.....	
1,552	160,000	.016	.00540	.....	.....	
1,600	165,000	.021	.005	.....	.....	
1,618	166,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	166,800
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00590
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		1″.35 outside the gauged section
Character of broken surface		fine silky

No. 4033.

Marks, No. 225.
Sectional area, ″.0986×″.0985=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00071	.00071	.....	.....	
388	40,000	.00155	.00084	.....	.....	
582	60,000	.00227	.00072	.....	.....	
776	80,000	.00307	.00080	.....	.....	
970	100,000	.00394	.00087	.....	.....	
1,164	120,000	.00475	.00081	.....	.....	
1,212	125,000	.00495	.00020	.....	.....	
1,261	130,000	.00517	.00022	.....	.....	
1,309	135,000	.00540	.00023	.....	.....	
1,358	140,000	.00565	.00025	.....	.....	
1,406	145,000	.00599	.00034	.....	.....	
1,455	150,000	.00629	.00030	.....	.....	
1,503	155,000	.00665	.00036	.....	.....	Elastic limit.
1,552	160,000	.00717	.00052	.....	.....	
1,600	165,000	.00795	.00078	.....	.....	
1,649	170,000	.00915	.00120	.....	.....	
1,697	175,000	.01168	.00253	.....	.....	
1,746	180,000	.031	.01932	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section ..... pounds..	180,000
Elastic limit per square inch of original section ..... do ..	155,000
Elongation per inch after rupture ..... inch..	.028
Elongation per inch under strain at elastic limit ..... do...	.00665
Reduction in area after rupture, per centum of original section	36.1
Position of rupture	1″.65 inside the gauged section
Character of broken surface	fine silky

No. 4056.

Marks, No. 235.
Sectional area, ″.0994×″.0995=.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00072	.00072	.....	.....	
396	40,000	.00147	.00075	.....	.....	
594	60,000	.00227	.00080	.....	.....	
792	80,000	.00307	.00080	.....	.....	
990	100,000	.00394	.00087	.....	.....	
1,188	120,000	.00493	.00099	.....	.....	
1,287	125,000	.00513	.00020	.....	.....	
1,287	130,000	.00540	.00027	.....	.....	
1,336	135,000	.00572	.00032	.....	.....	
1,386	140,000	.00610	.00038	.....	.....	Elastic limit.
1,436	145,000	.00653	.00043	.....	.....	
1,485	150,000	.00710	.00057	.....	.....	
1,535	155,000	.00778	.00068	.....	.....	
1,584	160,000	.00887	.00109	.....	.....	
1,634	165,000	.01085	.00198	.....	.....	
1,683	170,000	.01870	.00485	.....	.....	
1,712	172,980	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	172,980
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.019
Elongation per inch under strain at elastic limit	do...	.00610
Reduction in area after rupture, per centum of original section		35.4
Position of rupture		″.35 inside the gauged section
Character of broken surface		fine silky

No. 4058.

Marks, No. 245.
Sectional area, ″.0986×″.0987=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00081	.00081	.....	.....	
388	40,000	.00161	.00080	.....	.....	
582	60,000	.00244	.00083	.....	.....	
776	80,000	.00330	.00086	.....	.....	
970	100,000	.00427	.00097	.....	.....	
1,164	120,000	.00529	.00102	.....	.....	
1,212	125,000	.00568	.00039	.....	.....	
1,261	130,000	.00600	.00032	.....	.....	
1,309	135,000	.00635	.00035	.....	.....	Elastic limit.
1,358	140,000	.00680	.00045	.....	.....	
1,406	145,000	.00730	.00050	.....	.....	
1,455	150,000	.00812	.00082	.....	.....	
1,503	155,000	.00885	.00073	.....	.....	
1,552	160,000	.01047	.00162	.....	.....	
1,600	165,000	.01265	.00218	.....	.....	
1,649	170,000	.01775	.00510	.....	.....	
1,688	174,020	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,020
Elastic limit per square inch of original section	do....	135,000
Elongation per inch after rupture	inch..	.025
Elongation per inch under strain at elastic limit	do....	.00635
Reduction in area after rupture, per centum of original section		34.0
Position of rupture		1″.20 inside the gauged section
Character of broken surface		fine silky

No. 4059.

Marks, No. 250.
Sectional area, ″.0978 × ″.0987 = .0096 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
192	20,000	.00074	.00074			
384	40,000	.00150	.00076			
576	60,000	.00224	.00074			
768	80,000	.00312	.00078			
960	100,000	.00384	.00082			
1,152	120,000	.00472	.00088			
1,200	125,000	.00498	.00026			
1,248	130,000	.00520	.00022			
1,296	135,000	.00552	.00032			
1,344	140,000	.00589	.00037			
1,392	145,000	.00628	.00039			
1,440	150,000	.00668	.00040			Elastic limit.
1,488	155,000	.00724	.00056			
1,536	160,000	.00805	.00081			
1,584	165,000	.00892	.00087			
1,632	170,000	.01110	.00218			
1,680	175,000	.01586	.00476			
1,694	176,460					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	176,460
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00668
Reduction in area after rupture, per centum of original section		36.5
Position of rupture		11″.10 outside the gauged section
Character of broken surface		fine silky

No. 4060.

Marks, No. 255.
Sectional area, ″.0988×″.0988=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00082	.00082	.....	.....	
392	40,000	.00150	.00068	.....	.....	
588	60,000	.00234	.00084	.....	.....	
784	80,000	.00320	.00086	.....	.....	
980	100,000	.00402	.00082	.....	.....	
1,176	120,000	.00499	.00097	.....	.....	
1,225	125,000	.00521	.00029	.....	.....	
1,274	130,000	.00550	.00029	.....	.....	
1,323	135,000	.00582	.00032	.....	.....	
1,372	140,000	.00621	.00039	.....	.....	Elastic limit.
1,421	145,000	.00668	.00047	.....	.....	
1,470	150,000	.00723	.00055	.....	.....	
1,519	155,000	.00797	.00074	.....	.....	
1,568	160,000	.00930	.00133	.....	.....	
1,617	165,000	.01240	.00310	.....	.....	
1,650	168,370	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,370
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00621
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		2″.25 outside the gauged section
Character of broken surface		fine silky

No. 4061.

Marks, No. 260.
Sectional area, ″.0987×″.0993=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00072	.00072	.....	.....	
392	40,000	.00150	.00078	.....	.....	
588	60,000	.00225	.00075	.....	.....	
784	80,000	.00305	.00080	.....	.....	
980	100,000	.00388	.00083	.....	.....	
1,176	120,000	.00479	.00091	.....	.....	
1,225	125,000	.00499	.00020	.....	.....	
1,274	130,000	.00532	.00033	.....	.....	
1,323	135,000	.00549	.00017	.....	.....	
1,372	140,000	.00585	.00036	.....	.....	
1,421	145,000	.00605	.00020	.....	.....	
1,470	150,000	.00630	.00025	.....	.....	
1,519	155,000	.00665	.00035	.....	.....	Elastic limit.
1,568	160,000	.00707	.00042	.....	.....	
1,617	165,000	.00790	.00083	.....	.....	
1,666	170,000	.00875	.00085	.....	.....	
1,715	175,000	.00990	.00115	.....	.....	
1,764	180,000	.01190	.00200	.....	.....	
1,813	185,000	.021	.00910	.....	.....	
1,839	187,650	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	187,650
Elastic limit per square inch of original section	do ..	155,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do..	.00665
Reduction in area after rupture, per centum of original section		35.7
Position of rupture		1″.60 inside the gauged section
Character of broken surface		fine silky

No. 4062.

Marks, No. 265.
Sectional area, ″.0984×″.0994=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00075	.00075			
392	40,000	.00152	.00077			
588	60,000	.00234	.00082			
784	80,000	.00318	.00084			
980	100,000	.00410	.00092			
1,176	120,000	.00510	.00100			
1,225	125,000	.00537	.00027			
1,274	130,000	.00578	.00041			
1,323	135,000	.00603	.00025			
1,372	140,000	.00639	.00037			Elastic limit.
1,421	145,000	.00675	.00045			
1,470	150,000	.00720	.00045			
1,519	155,000	.00784	.00064			
1,568	160,000	.00887	.00103			
1,617	165,000	.01048	.00161			
1,666	170,000	.01560	.00512			
1,715	175,000	.027	.01140			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	175,000
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.026
Elongation per inch under strain at elastic limit	do...	.00630
Reduction in area after rupture, per centum of original section		31.6
Position of rupture		4″.57 inside the gauged section
Character of broken surface		fine silky

No. 4063.

Marks, No. 270.
Sectional area, ".0990×".0992=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00077	.00077	.....	.....	
392	40,000	.00157	.00080	.....	.....	
588	60,000	.00230	.00073	.....	.....	
784	80,000	.00312	.00082	.....	.....	
980	100,000	.00399	.00087	.....	.....	
1,176	120,000	.00492	.00093	.....	.....	
1,225	125,000	.00517	.00025	.....	.....	
1,274	130,000	.00548	.00031	.....	.....	
1,323	135,000	.00578	.00030	.....	.....	
1,372	140,000	.00611	.00033	.....	.....	
1,421	145,000	.00650	.00039	.....	.....	Elastic limit.
1,470	150,000	.00695	.00045	.....	.....	
1,519	155,000	.00755	.00060	.....	.....	
1,568	160,000	.00838	.00083	.....	.....	
1,617	165,000	.00972	.00134	.....	.....	
1,666	170,000	.01275	.00303	.....	.....	
1,715	175,000	.022	.00925	.....	.....	
1,742	177,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	177,760
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.026
Elongation per inch under strain at elastic limit	do...	.00650
Reduction in area after rupture, per centum of original section		34.7
Position of rupture		4".25 inside the gauged section
Character of broken surface		fine silky

No. 4064.

Marks, No. 275.
Sectional area, ″.0992×″.0991=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00074	.00074			
392	40,000	.00148	.00074			
588	60,000	.00228	.00080			
784	80,000	.00310	.00092			
980	100,000	.00400	.00090			
1,176	120,000	.00498	.00098			
1,225	125,000	.00518	.00020			
1,274	130,000	.00552	.00034			
1,323	135,000	.00587	.00035			Elastic limit.
1,372	140,000	.00628	.00041			
1,421	145,000	.00685	.00057			
1,470	150,000	.00775	.00090			
1,519	155,000	.00940	.00165			
1,568	160,000	.01520	.00580			
1,617	165,000					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	165,000
Elastic limit per square inch of original section	do	135,000
Elongation per inch after rupture	inch	.030
Elongation per inch under strain at elastic limit	do	.00587
Reduction in area after rupture, per centum of original section		39.8
Position of rupture	2″.12 inside the gauged section	
Character of broken surface	fine silky	

No. 4065.

Marks, No. 280.
Sectional area, ″.0986×″.0986=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00071	.00071			
388	40,000	.00142	.00071			
582	60,000	.00230	.00088			
776	80,000	.00307	.00077			
970	100,000	.00388	.00081			
1,164	120,000	.00488	.00100			
1,212	125,000	.00507	.00019			
1,261	130,000	.00527	.00020			
1,309	135,000	.00557	.00030			
1,358	140,000	.00585	.00028			
1,406	145,000	.00620	.00035			
1,455	150,000	.00655	.00035			Elastic limit.
1,503	155,000	.00700	.00045			
1,552	160,100	.00760	.00060			
1,600	165,000	.00847	.00087			
1,649	170,000	.01005	.00158			
1,697	175,000	.01240	.00235			
1,746	180,000	.01720	.00480			
1,781	183,610					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	183,610
Elastic limit per square inch of original section	do	150,000
Elongation per inch after rupture	inch	.020
Elongation per inch under strain at elastic limit	do	.00655
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		2″.48 inside the gauged section
Character of broken surface		fine silky

No. 4066.

Marks, No. 295.
Sectional area, ″.0990×″.0993=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00073	.00073	.....	.....	
392	40,000	.00144	.00071	.....	.....	
588	60,000	.00218	.00074	.....	.....	
784	80,000	.00301	.00083	.....	.....	
980	100,000	.00386	.00085	.....	.....	
1,176	120,000	.00484	.00098	.....	.....	
1,225	125,000	.00499	.00015	.....	.....	
1,274	130,000	.00529	.00030	.....	.....	
1,323	135,000	.00559	.00030	.....	.....	
1,372	140,000	.00586	.00027	.....	.....	
1,421	145,000	.00621	.00035	.....	.....	Elastic limit.
1,470	150,000	.00666	.00045	.....	.....	
1,519	155,000	.00718	.00052	.....	.....	
1,568	160,000	.00765	.00047	.....	.....	
1,617	165,000	.00856	.00091	.....	.....	
1,666	170,000	.01045	.00189	.....	.....	
1,715	175,000	.01622	.00577	.....	.....	
1,728	176,330	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	176,330
Elastic limit per square inch of original section	do ..	145,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00621
Reduction in area after rupture, per centum of original section		38.8
Position of rupture		2″.50 inside the gauged section
Character of broken surface		fine silky

No. 4067.

Marks, No. 300.
Sectional area, ".0987×".0985=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00078	.00078	.....	.....	
388	40,000	.00153	.00075	.....	.....	
582	60,000	.00230	.00077	.....	.....	
776	80,000	.00310	.00080	.....	.....	
970	100,000	.00395	.00085	.....	.....	
1,164	120,000	.00481	.00086	.....	.....	
1,212	125,000	.00506	.00025	.....	.....	
1,261	130,000	.00528	.00022	.....	.....	
1,309	135,000	.00556	.00028	.....	.....	
1,358	140,000	.00590	.00034	.....	.....	
1,406	145,000	.00628	.00038	.....	.....	Elastic limit.
1,455	150,000	.00685	.00057	.....	.....	
1,503	155,000	.00760	.00075	.....	.....	
1,552	160,000	.01252	.00492	.....	.....	
1,563	161,130	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	161,130
Elastic limit per square inch of original section	do ..	145,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00628
Reduction in area after rupture, per centum of original section		37.1
Position of rupture	5".20 outside the gauged section	
Character of broken surface		fine silky

No. 4068.

Marks, No. 310.
Sectional area, ″.0982×″.0986=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00075	.00075	.....	.....	
388	40,000	.00148	.00073	.....	.....	
582	60,000	.00234	.00086	.....	.....	
776	80,000	.00312	.00078	.....	.....	
970	100,000	.00393	.00081	.....	.....	
1,164	120,000	.00477	.00084	.....	.....	
1,212	125,000	.00502	.00025	.....	.....	
1,261	130,000	.00526	.00024	.....	.....	
1,309	135,000	.00551	.00025	.....	.....	
1,358	140,000	.00577	.00026	.....	.....	
1,406	145,000	.00610	.00033	.....	.....	
1,455	150,000	.00642	.00032	.....	.....	Elastic limit.
1,503	155,000	.00696	.00054	.....	.....	
1,552	160,000	.00776	.00080	.....	.....	
1,600	165,000	.01231	.00455	.....	.....	
1,632	168,250	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,250
Elastic limit per square inch of original section	do ..	150,000
Elongation per inch after rupture	inch..	.097
Elongation per inch under strain at elastic limit	do...	.00642
Reduction in area after rupture, per centum of original section		57.1
Position of rupture		5″.95 outside the gauged section
Character of broken surface		fine silky

No. 4069.

Marks No. 315.
Sectional area, ".0990 × ".0992 = .0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00072	.00072	.....	.....	
392	40,000	.00149	.00077	.....	.....	
588	60,000	.00219	.00070	.....	.....	
784	80,000	.00302	.00083	.....	.....	
980	100,000	.00392	.00090	.....	.....	
1,176	120,000	.00490	.00098	.....	.....	
1,225	125,000	.00512	.00022	.....	.....	
1,274	130,000	.00542	.00030	.....	.....	
1,323	135,000	.00574	.00032	.....	.....	Elastic limit.
1,372	140,000	.00627	.00053	.....	.....	
1,421	145,000	.00672	.00045	.....	.....	
1,470	150,000	.00720	.00048	.....	.....	
1,519	155,000	.00813	.00093	.....	.....	
1,568	160,000	.00970	.00157	.....	.....	
1,617	165,000	.07450	.00480	.....	.....	
1,628	166,120	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	166,120
Elastic limit per square inch of original section	do...	135,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain of elastic limit	do...	.00574
Reduction in area after rupture, per centum of original section		31.6
Position of rupture		1."25 inside the gauged section
Character of broken surface		fine silky

No. 4070.

Marks, No. 320.
Sectional area, ″.1003×″.1006=.0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
202	20,000	.00072	.00072			
404	40,000	.00142	.00070			
606	60,000	.00228	.00086			
808	80,000	.00308	.00080			
1,010	100,000	.00398	.00090			
1,212	120,000	.00488	.00090			
1,262	125,000	.00510	.00022			
1,313	130,000	.00547	.00037			
1,363	135,000	.00578	.00031			
1,414	140,000	.00615	.00037			Elastic limit.
1,464	145,000	.00662	.00047			
1,515	150,000	.00715	.00053			
1,565	155,000	.00785	.00070			
1,616	160,000	.00935	.00150			
1,666	165,000	.01395	.00460			
1,684	166,730					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	166,730
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.097
Elongation per inch under strain at elastic limit	do...	.00615
Reduction in area after rupture, per centum of original section		36.6
Position of rupture		5″.30 outside the gauged section
Character of broken surface		fine silky

No. 4071.

Marks, No. 325.
Sectional area, ".0983×".0986=.0097 sqnare inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5, 000	0.	0.	0.	0.	Initial load.
194	20, 000	.00077	.00077	.....	.....	
388	40, 000	.00154	.00077	.....	.....	
582	60, 000	.00232	.00078	.....	.....	
776	80, 000	.00313	.00081	.....	.....	
970	100, 000	.00417	.00104	.....	.....	
1, 164	120, 000	.00520	.00103	.....	.....	
1, 212	125, 000	.00545	.00025	.....	.....	
1, 261	130, 000	.00588	.00043	.....	.....	
1, 309	135, 000	.00625	.00037	.....	.....	Elastic limit.
1, 358	140, 000	.00670	.00045	.....	.....	
1, 406	145, 000	.00718	.00048	.....	.....	
1, 455	150, 000	.00768	.00050	.....	.....	
1, 503	155, 000	.00845	.00077	.....	.....	
1, 552	160, 000	.00990	.00145	.....	.....	
1, 600	165, 000	.01225	.00235	.....	.....	
1, 649	170, 000	.02034	.00809	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	170, 000
Elastic limit per square inch of original section	do...	135, 000
Elongation per inch after rupture	inch..	.013
Elongation per inch under strain at elastic limit	do...	.00625
Reduction in area after rupture, per centum of original section		34.0
Position of rupture	5".30 outside the gauged section	
Character of broken surface		fine silky

No. 4087.

Marks, No. 335.
Sectional area, ″.0983×″.0987=.0097 square inch.
Gauged length, 10′.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00972	.00072	.....	.....	
388	40,000	.00151	.00079	.....	.....	
582	60,000	.00220	.00069	.....	.....	
776	80,000	.00305	.00085	.....	.....	
970	100,000	.00396	.00091	.....	.....	
1,164	120,000	.00515	.00119	.....	.....	
1,212	125,000	.00535	.00020	.....	.....	
1,261	130,000	.00575	.00040	.....	.....	Elastic limit.
1,309	135,000	.00618	.00043	.....	.....	
1,358	140,000	.00668	.00070	.....	.....	
1,406	145,000	.00730	.00062	.....	.....	
1,455	150,000	.00815	.00085	.....	.....	
1,503	155,000	.01090	.00275	.....	.....	
1,552	160,000	.021	.0101	.....	.....	
1,586	163,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	163,500
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.016
Elongation per inch under strain at elastic limit	do ..	.00575
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1″.40 outside the gauged section
Character of broken surface		fine silky

No. 4088.

Marks, No. 340.
Sectional area, ″.0993 × ″.0987 = .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00080	.00080	.....	.....	
392	40,000	.00160	.00080	.....	.....	
588	60,000	.00242	.00082	.....	.....	
784	80,000	.00319	.00077	.....	.....	
980	100,000	.00413	.00094	.....	.....	
1,176	120,000	.00519	.00106	.....	.....	
1,225	125,000	.00542	.00023	.....	.....	
1,274	130,000	.00574	.00032	.....	.....	
1,323	135,000	.00610	.00036	.....	.....	
1,372	140,000	.00647	.00037	.....	.....	Elastic limit.
1,421	145,000	.00700	.00053	.....	.....	
1,470	150,000	.00772	.00072	.....	.....	
1,519	155,000	.00878	.00106	.....	.....	
1,568	160,000	.01112	.00234	.....	.....	
1,617	165,000	.022	.01088	.....	.....	
1,641	167,450	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	167,450
Elastic limit per square inch of original section	do....	140,000
Elongation per inch after rupture	inch..	.028
Elongation per inch under strain at elastic limit	do....	.00647
Reduction in area after rupture, per centum of original section		43.9
Position of rupture		2″.15 inside the gauged section
Character of broken surface		fine silky

No. 4089.

Marks, No. 360.
Sectional area, ″.0987 × ″.0986 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00079	.00079	.....	.....	
388	40,000	.00159	.00080	.....	.....	
582	60,000	.00235	.00076	.....	.....	
776	80,000	.00329	.00094	.....	.....	
970	100,000	.00429	.00100	.....	.....	
1,164	120,000	.00562	.00133	.....	.....	
1,212	125,000	.00589	.00027	.....	.....	Elastic limit.
1,261	130,000	.00638	.00049	.....	.....	
1,309	135,000	.00708	.00070	.....	.....	
1,358	140,000	.00777	.00069	.....	.....	
1,406	145,000	.00906	.00129	.....	.....	
1,455	150,000	.01062	.00156	.....	.....	
1,503	155,000	.017	.00638	.....	.....	
1,546	159,380	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	159,380
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit		.00589
Reduction in area after rupture, per centum of original section		36.1
Position of rupture		3″.1 inside the gauged section
Character of broken surface		fine silky

No. 4090.

Marks, No. 365.
Sectional area, ".0988×".0988=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00077	.00077	.....	.....	
392	40,000	.00155	.00078	.....	.....	
588	60,000	.00234	.00079	.....	.....	
784	80,000	.00321	.00087	.....	.....	
980	100,000	.00420	.00099	.....	.....	
1,176	120,000	.00544	.00124	.....	.....	
1,225	125,000	.00577	.00033	.....	.....	
1,274	130,000	.00613	.00036	.....	.....	Elastic limit.
1,323	135,000	.00667	.00054	.....	.....	
1,372	140,000	.00727	.00060	.....	.....	
1,421	145,000	.00810	.00083	.....	.....	
1,470	150,000	.00932	.00122	.....	.....	
1,519	155,000	.01170	.00238	.....	.....	
1,568	160,000	.019	.00730	.....	.....	
1,597	162,960	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	162,960
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00613
Reduction in area after rupture, per centum of original section		49.0
Position of rupture		".75 outside the gauged section
Character of broken surface		fine silky

No. 4091.

Marks, No. 370.
Sectional area, ".0996×".0999=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00088	.00088	.....	.....	
400	40,000	.00178	.00090	.....	.....	
600	60,000	.00249	.00071	.....	.....	
800	80,000	.00338	.00089	.....	.....	
1,000	100,000	.00427	.00089	.....	.....	
1,200	120,000	.00520	.00093	.....	.....	
1,250	125,000	.00545	.00025	.....	.....	
1,300	130,000	.00572	.00027	.....	.....	
1,350	135,000	.00605	.00033	.....	.....	
1,400	140,000	.00635	.00030	.....	.....	
1,450	145,000	.00675	.00040	.....	.....	Elastic limit.
1,500	150,000	.00728	.00053	.....	.....	
1,550	155,000	.00800	.00072	.....	.....	
1,600	160,000	.00895	.00095	.....	.....	
1,650	165,000	.01060	.00165	.....	.....	
1,700	170,000	.01435	.00375	.....	.....	
1,750	175,000	.029	.01465	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	175,000
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.029
Elongation per inch under strain at elastic limit	do...	.00675
Reduction in area after rupture, per centum of original section		45.0
Position of rupture		4".7 inside the gauged section
Character of broken surface		fine, silky

No. 4092.

Marks, No. 375.
Sectional area, ".0995×".0996=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00081	.00081			
396	40,000	.00161	.00120			
594	60,000	.00241	.00080			
792	80,000	.00328	.00087			
990	100,000	.00418	.00090			
1,188	120,000	.00521	.00103			
1,237	125,000	.00547	.00026			
1,287	130,000	.00570	.00023			
1,336	135,000	.00607	.00037			
1,386	140,000	.00650	.00043			
1,436	145,000	.00687	.00037			Elastic limit.
1,485	150,000	.00737	.00050			
1,535	155,000	.00810	.00073			
1,584	160,000	.00900	.00090			
1,634	165,000	.01035	.00135			
1,683	170,000	.01317	.00282			
1,733	175,000	.023	.00973			
1,746	176,360					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	176,360
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00687
Reduction in area after rupture, per centum of original section		46.5
Position of rupture		".25 outside the gauged section
Character of broken surface		fine silky

No. 4093.

Marks, No. 380.
Sectional area, ".0992×."0980=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
195	20,000	.00078	.00073	.....	.....	
388	40,000	.00154	.00081	.....	.....	
582	60,000	.00229	.00075	.....	.....	
776	80,000	.00314	.00085	.....	.....	
970	100,000	.00404	.00090	.....	.....	
1,164	120,000	.00524	.00120	.....	.....	
1,212	125,000	.00552	.00028	.....	.....	
1,261	130,000	.00587	.00035	.....	.....	Elastic limit.
1,309	135,000	.00637	.00050	.....	.....	
1,358	140,000	.00687	.00050	.....	.....	
1,406	145,000	.00772	.00085	.....	.....	
1,455	150,000	.00920	.00148	.....	.....	
1,503	155,000	.01190	.00270	.....	.....	
1,552	160,000	.021	.00910	.....	.....	
1,596	164,540	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	164,540
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.07
Elongation per inch under strain at elastic limit	do...	.00587
Reduction in area after rupture, per centum of original section		45.4
Position of rupture		1".8 inside the gauged section
Character of broken surface		fine silky

No. 4094.

Marks, No. 385.
Sectional area, ″.0985 × ″.0990 = .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00071	.00071	.....	.....	
392	40,000	.00148	.00077	.....	.....	
588	60,000	.00223	.00075	.....	.....	
784	80,000	.00305	.00082	.....	.....	
980	100,000	.00390	.00085	.....	.....	
1,176	120,000	.00494	.00104	.....	.....	
1,225	125,000	.00510	.00016	.....	.....	
1,274	130,000	.00540	.00030	.....	.....	
1,323	135,000	.00576	.00036	.....	.....	
1,372	140,000	.00607	.00031	.....	.....	Elastic limit.
1,421	145,000	.00650	.00043	.....	.....	
1,470	150,000	.00710	.00060	.....	.....	
1,519	155,000	.00800	.00090	.....	.....	
1,568	160,000	.01012	.00212	.....	.....	
1,617	165,000	.021	.01088	.....	.....	
1,652	168,570	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds..**	**168,570**
Elastic limit per square inch of original section	**do...**	**140,000**
Elongation per inch after rupture	**inch..**	**.024**
Elongation per inch under strain at elastic limit	**do...**	**.00607**
Reduction in area after rupture, per centum of original section		**45.9**
Position of rupture		**″.45 outside the gauged section**
Character of broken surface		**fine silky**

No. 4095.

Marks, No. 390.
Sectional area, ″.0993 × ″.0994 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00070	.00070	.....	.....	
396	40,000	.00140	.00070	.....	.....	
594	60,000	.00217	.00077	.....	.....	
792	80,000	.00297	.00080	.....	.....	
990	100,000	.00377	.00080	.....	.....	
1,188	120,000	.00460	.00083	.....	.....	
1,237	125,000	.00479	.00019	.....	.....	
1,287	130,000	.00502	.00023	.....	.....	
1,336	135,000	.00525	.00023	.....	.....	
1,386	140,000	.00550	.00025	.....	.....	
1,436	145,000	.00577	.00027	.....	.....	Elastic limit.
1,485	150,000	.00617	.00040	.....	.....	
1,535	155,000	.00657	.00040	.....	.....	
1,584	160,000	.00722	.00065	.....	.....	
1,634	165,000	.00850	.00128	.....	.....	
1,683	170,000	.01300	.00450	.....	.....	
1,733	175,000	.026	.013	.....	.....	
1,745	176,260	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	176,260
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00577
Reduction in area after rupture, per centum of original section		41.4
Position of rupture		3″.1 outside the gauged section
Character of broken surface		fine silky

No. 4096.

Marks, 395.
Sectional area, ".0995×".0987=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.000070	.000070			
392	40,000	.000148	.000078			
588	60,000	.000231	.000083			
784	80,000	.000310	.000079			
980	100,000	.000398	.000088			
1,176	120,000	.000498	.000100			
1,225	125,000	.000515	.000017			
1,274	130,000	.000558	.000043			
1,323	135,000	.000588	.000030			
1,372	140,000	.000617	.000029			Elastic limit.
1,421	145,000	.000667	.000050			
1,470	150,000	.000725	.000058			
1,519	155,000	.000845	.000120			
1,568	160,000	.001137	.000292			
1,617	165,000	.024	.001263			
1,646	167,960					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	167,960
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00617
Reduction in area after rupture, per centum of original section		30.8
Position of rupture		".70 outside the gauged section
Character of broken surface		fine silky

No. 4097.

Marks, No. 400.
Sectional area, ″.0985×″.0988=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00082	.00082	.....	.....	
388	40,000	.00160	.00078	.....	.....	
582	60,000	.00247	.00087	.....	.....	
776	80,000	.00330	.00083	.....	.....	
970	100,000	.00422	.00092	.....	.....	
1,164	120,000	.00525	.00103	.....	.....	
1,212	125,000	.00548	.00023	.....	.....	
1,261	130,000	.00583	.00035	.....	.....	
1,309	135,000	.00625	.00042	.....	.....	
1,358	140,000	.00655	.00030	.....	.....	Elastic limit.
1,406	145,000	.00710	.00055	.....	.....	
1,455	150,000	.00758	.00048	.....	.....	
1,503	155,000	.00847	.00089	.....	.....	
1,552	160,000	.00951	.00104	.....	.....	
1,600	165,000	.01160	.00209	.....	.....	
1,649	170,000	.020	.0084	.....	.....	
1,679	173,090	.....	.....	.....	.....	Tensile strength.

Tensile strength per square inch of original section	pounds..	173,090
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00655
Reduction in area after rupture, per centum of original section		42.5
Position of rupture		1″.1 inside the gauged section
Character of broken surface		fine silky

No. 4098.

Marks, 405.
Sectional area, ″.0994×″.0993=.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00071	.00071	.....	.....	
396	40,000	.00157	.00086	.....	.....	
594	60,000	.00240	.00083	.....	.....	
792	80,000	.00333	.00093	.....	.....	
990	100,000	.00433	.00100	.....	.....	
1,188	120,000	.00558	.00125	.....	.....	
1,237	125,000	.00587	.00029	.....	.....	
1,287	130,000	.00625	.00038	.....	.....	Elastic limit.
1,336	135,000	.00672	.00047	.....	.....	
1,386	140,000	.00720	.00048	.....	.....	
1,436	145,000	.00782	.00062	.....	.....	
1,485	150,000	.00862	.00080	.....	.....	
1,535	155,000	.00967	.00105	.....	.....	
1,584	160,000	.01112	.00145	.....	.....	
1,634	165,000	.016	.00488	.....	.....	
1,683	170,000	.021	.005	.....	.....	
1,704	172,120	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	172,120
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00625
Reduction in area after rupture, per centum of original section		40.4
Position of rupture		4″.5 inside the gauged section
Character of broken surface		fine silky

No. 4099.

Marks, No. 410.
Sectional area, ″.0997 × ″.0997 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00075	.00075			
396	40,000	.00153	.00078			
594	60,000	.00232	.00079			
792	80,000	.00319	.00087			
990	100,000	.00410	.00091			
1,188	120,000	.00527	.00117			
1,237	125,000	.00552	.00025			
1,287	130,000	.00590	.00038			
1,336	135,000	.00630	.00040			Elastic limit.
1,386	140,000	.00680	.00050			
1,436	145,000	.00741	.00061			
1,485	150,000	.00822	.00081			
1,535	155,000	.00942	.00120			
1,584	160,000	.01165	.00223			
1,634	165,000	.017	.00535			
1,683	170,000	.030	.013			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	170,000
Elastic limit per square inch of original section	do	135,000
Elongation per inch after rupture	inch	.024
Elongation per inch under strain at elastic limit	do	.00630
Reduction in area after rupture, per centum of original section		41.4
Position of rupture		3″.2 inside the gauged section
Character of broken surface		fine silky

No. 4100.

Marks, 415.
Sectional area, ″.0986×″.0985=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00077	.00077	.....	.....	
388	40,000	.00152	.00075	.....	.....	
582	60,000	.00228	.00076	.....	.....	
776	80,000	.00308	.00080	.....	.....	
970	100,000	.00390	.00082	.....	.....	
1,164	120,000	.00478	.00088	.....	.....	
1,212	125,000	.00497	.00019	.....	.....	
1,261	130,000	.00527	.00030	.....	.....	
1,309	135,000	.00548	.00021	.....	.....	
1,358	140,000	.00577	.00029	.....	.....	
1,406	145,000	.00608	.00031	.....	.....	
1,455	150,000	.00648	.00040	.....	.....	Elastic limit.
1,503	155,000	.00708	.00060	.....	.....	
1,552	160,000	.00825	.00117	.....	.....	
1,600	165,000	.01120	.00295	.....	.....	
1,649	170,000	.024	.01280	.....	.....	
1,677	172,890	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	172,890
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00648
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		5″ outside the gauged section
Character of broken surface		fine silky

No. 4101.

Marks, No. 420.
Sectional area, ".0996×".0992=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00078	.00078	.....	.....	
396	40,000	.00154	.00076	.....	.....	
594	60,000	.00229	.00075	.....	.....	
792	80,000	.00321	.00092	.....	.....	
990	100,000	.00418	.00097	.....	.....	
1,188	120,000	.00523	.00105	.....	.....	
1,237	125,000	.00547	.00024	.....	.....	
1,287	130,000	.00580	.00033	.....	.....	
1,336	135,000	.00612	.00032	.....	.....	
1,386	140,000	.00654	.00042	.....	.....	Elastic limit.
1,436	145,000	.00712	.00058	.....	.....	
1,485	150,000	.00797	.00085	.....	.....	
1,535	155,000	.00917	.00120	.....	.....	
1,584	160,000	.01195	.00278	.....	.....	
1,634	165,000	.020	.00805	.....	.....	
1,671	168,790	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,790
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.028
Elongation per inch under strain at elastic limit	do...	.00654
Reduction in area after rupture, per centum of original section		38.4
Position of rupture		4."85 inside the gauged section
Character of broken surface		fine silky

No. 4102.

Marks, No. 425.
Sectional area, ″.0987×″.0990=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00073	.00073	.....	.....	
392	40,000	.00150	.00077	.....	.....	
588	60,000	.00230	.00080	.....	.....	
784	80,000	.00316	.00086	.....	.....	
980	100,000	.00420	.00104	.....	.....	
1,176	120,000	.00529	.00109	.....	.....	
1,225	125,000	.00569	.00040	.....	.....	
1,274	130,000	.00602	.00033	.....	.....	Elastic limit.
1,323	135,000	.00652	.00050	.....	.....	
1,372	140,000	.00700	.00048	.....	.....	
1,421	145,000	.00771	.00071	.....	.....	
1,470	150,000	.00860	.00089	.....	.....	
1,519	155,000	.01000	.00140	.....	.....	
1,568	160,000	.01215	.00215	.....	.....	
1,617	165,000	.017	.00455	.....	.....	
1,662	169,590	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original strength	pounds..	169,590
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.027
Elongation per inch under strain at elastic limit	do...	.00602
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		3″.4 inside the gauged section
Character of broken surface		fine silky

No. 4105.

Marks, No. 440.
Sectional area, ".1001 × ".0998 = .010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00078	.00078			
400	40,000	.00161	.00083			
600	60,000	.00250	.00089			
800	80,000	.00325	.00075			
1,000	100,000	.00400	.00075			
1,200	120,000	.00491	.00091			
1,250	125,000	.00510	.00019			
1,300	130,000	.00537	.00027			
1,350	135,000	.00571	.00034			
1,400	140,000	.00605	.00034			
1,450	145,000	.00642	.00037			Elastic limit.
1,500	150,000	.00685	.00043			
1,550	155,000	.00735	.00050			
1,600	160,000	.00820	.00085			
1,650	165,000	.00941	.00121			
1,700	170,000	.01325	.00384			
1,748	174,800					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	174,800
Elastic limit per square inch of original section	do	145,000
Elongation per inch after rupture	inch	.021
Elongation per inch under strain at elastic limit	do	.00642
Reduction in area after rupture, per centum of original section		42.0
Position of rupture		3".1 inside the gauged section
Character of broken surface		fine silky

No. 4106.

Marks, No. 445.
Sectional area, ″.0986 × ″.0983 = .0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00078	.00078	.....	.....	
388	40,000	.00158	.00080	.....	.....	
582	60,000	.00265	.00107	.....	.....	
776	80,000	.00325	.00060	.....	.....	
970	100,000	.00425	.00100	.....	.....	
1,164	120,000	.00508	.00083	.....	.....	
1,212	125,000	.00530	.00022	.....	.....	
1,261	130,000	.00552	.00022	.....	.....	
1,309	135,000	.00592	.00040	.....	.....	
1,358	140,000	.00630	.00038	.....	.....	
1,406	145,000	.00668	.00038	.....	.....	Elastic limit.
1,455	150,000	.00735	.00067	.....	.....	
1,503	155,000	.00807	.00072	.....	.....	
1,552	160,000	.01050	.00243	.....	.....	
1,600	165,000	.01395	.00345	.....	.....	
1,649	170,000	.023	.00905	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	170,000
Elastic limit per square inch of original section	do ..	145,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit	do...	.00668
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		3″.9 inside the gauged section
Character of broken surface		fine silky

No. 4107.

Marks, No. 450.
Sectional area, ".0984×".0986=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00077	.00077	.....	.....	
388	40,000	.00150	.00073	.....	.....	
582	60,000	.00227	.00077	.....	.....	
776	80,000	.00322	.00095	.....	.....	
970	100,000	.00410	.00088	.....	.....	
1,164	120,000	.00530	.00120	.....	.....	
1,212	125,000	.00557	.00027	.....	.....	
1,261	130,000	.00587	.00030	.....	.....	Elastic limit.
1,309	135,000	.00632	.00045	.....	.....	
1,358	140,000	.00672	.00040	.....	.....	
1,406	145,000	.00740	.00068	.....	.....	
1,455	150,000	.00880	.00140	.....	.....	
1,503	155,000	.01040	.00160	.....	.....	
1,552	160,000	.015	.00460	.....	.....	
1,596	164,540	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	164,540
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	0.019
Elongation per inch under strain at elastic limit	do...	.00587
Reduction in area after rupture, per centum of original section		39.2
Position of rupture		1".8 outside the gauged section
Character of broken surface		fine silky

No. 4108.

Marks, No. 455.
Sectional area, ".1002×".1000=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	.....	.....	Initial load.
200	20,000	.00080	.00080	.....	.....	
400	40,000	.00160	.00080	.....	.....	
600	60,000	.00242	.00082	.....	.....	
800	80,000	.00318	.00076	.....	.....	
1,000	100,000	.00403	.00085	.....	.....	
1,200	120,000	.00492	.00089	.....	.....	
1,250	125,000	.00508	.00016	.....	.....	
1,300	130,000	.00537	.00029	.....	.....	
1,350	135,000	.00562	.00025	.....	.....	
1,400	140,000	.00592	.00030	.....	.....	
1,450	145,000	.00622	.00030	.....	.....	
1,500	150,000	.00660	.00038	.....	.....	
1,550	155,000	.00700	.00040	.....	.....	Elastic limit.
1,600	160,000	.00750	.00050	.....	.....	
1,650	165,000	.00817	.00067	.....	.....	
1,700	170,000	.00920	.00103	.....	.....	
1,750	175,000	.01168	.00248	.....	.....	
1,800	180,000	.020	.00832	.....	.....	
1,833	183,300	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	183,300
Elastic limit per square inch of original section	do...	155,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00700
Reduction in area after rupture, per centum of original section		28.0
Position of rupture		4".2 inside the gauged section
Character of broken surface		fine silky

No. 4109.

Marks, No. 460.
Sectional area, ".1002×".0998=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00080	.00080	.....	.....	
400	40,000	.00142	.00062	.....	.....	
600	60,000	.00230	.00088	.....	.....	
800	80,000	.00303	.00073	.....	.....	
1,000	100,000	.00388	.00085	.....	.....	
1,200	120,000	.00467	.00079	.....	.....	
1,250	125,000	.00485	.00018	.....	.....	
1,300	130,000	.00517	.00032	.....	.....	
1,350	135,000	.00538	.00021	.....	.....	
1,400	140,000	.00567	.00029	.....	.....	
1,450	145,000	.00600	.00033	.....	.....	
1,500	150,000	.00635	.00035	.....	.....	Elastic limit.
1,550	155,000	.00680	.00045	.....	.....	
1,600	160,000	.00740	.00060	.....	.....	
1,650	165,000	.00840	.00100	.....	.....	
1,700	170,000	.01070	.00230	.....	.....	
1,750	175,000	.022	.01130	.....	.....	
1,788	178,800	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	178,800
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.028
Elongation per inch under strain at elastic limit	do...	.00515
Reduction in area after rupture, per centum of original section		39.0
Position of rupture		3".75 inside the gauged section
Character of broken surface		Fine silky

No. 4110.

Marks, No. 465.
Sectional area, ″.1003 × ″.1005 = .0101 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
202	20,000	.00087	.00087	.....	.....	
404	40,000	.00158	.00071	.....	.....	
606	60,060	.00228	.00070	.....	.....	
808	80,000	.00314	.00086	.....	.....	
1,010	100,000	.00410	.00096	.....	.....	
1,212	120,000	.00518	.00108	.....	.....	
1,262	125,000	.00537	.00019	.....	.....	
1,313	130,000	.00560	.00023	.....	.....	Elastic limit.
1,363	135,000	.00603	.00043	.....	.....	
1,414	140,000	.00652	.00049	.....	.....	
1,464	145,000	.00692	.00040	.....	.....	
1,515	150,000	.00743	.00051	.....	.....	
1,565	155,000	.00822	.00079	.....	.....	
1,616	160,000	.00960	.00138	.....	.....	
1,666	165,000	.01275	.00315	.....	.....	
1,710	169,310	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	169,310
Elastic limit per square inch of original section	do..	130,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00560
Reduction in area after rupture, per centum of original section		39.6
Position of rupture		4″.15 outside the gauged section
Character of broken surface		fine silky

No. 4111.

Marks, No. 470.
Sectional area, ".1003×".1001=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00072	.00072	.....	.....	
400	40,000	.00152	.00080	.....	.....	
600	60,000	.00228	.00076	.....	.....	
800	80,000	.00318	.00090	.....	.....	
1,000	100,000	.00412	.00094	.....	.....	
1,200	120,000	.00500	.00088	.....	.....	
1,250	125,000	.00520	.00020	.....	.....	
1,300	130,000	.00548	.00028	.....	.....	Elastic limit.
1,350	135,000	.00590	.00042	.....	.....	
1,400	140,000	.00632	.00042	.....	.....	
1,450	145,000	.00680	.00048	.....	.....	
1,500	150,000	.00758	.00078	.....	.....	
1,550	155,000	.00883	.00125	.....	.....	
1,600	160,000	.01350	.00467	.....	.....	
1,650	165,000	.024	.01050	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	165,000
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.016
Elongation per inch under strain at elastic limit	do...	.00548
Reduction in area after rupture, per centum of original section		39.0
Position of rupture		2".1 outside the gauged section
Character of broken surface		fine silky

No. 4112.

Marks, No. 475.
Sectional area, ″.1001×″.0999=.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	.0	0.	Initial load.
200	20,000	.00070	.00070			
400	40,000	.00152	.00082			
600	60,000	.00232	.00080			
800	80,000	.00320	.00088			
1,000	100,000	.00403	.00083			
1,200	120,000	.00520	.00117			
1,250	125,000	.00540	.00020			
1,300	130,000	.00570	.00030			
1,350	135,000	.00608	.00038			
1,400	140,000	.00647	.00039			Elastic limit.
1,450	145,000	.00693	.00046			
1,500	150,000	.00755	.00062			
1,550	155,000	.00813	.00088			
1,600	160,000	.01010	.00167			
1,650	165,000	.01485	.00475			
1,669	168,900					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,900
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00647
Reduction in area after rupture, per centum of original section		31.0
Position of rupture		4″ inside the gauged section
Character of broken surface		fine silky

No. 4113.

Marks, No. 480.
Sectional area, ″.0999×″.0996=.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00078	.00078	.....	.....	
400	40,000	.00153	.00075	.....	.....	
600	60,000	.00233	.00080	.....	.....	
800	80,000	.00318	.00085	.....	.....	
1,000	100,000	.00398	.00080	.....	.....	
1,200	120,000	.00498	.00100	.....	.....	
1,250	125,000	.00527	.00029	.....	.....	
1,300	130,000	.00550	.00023	.....	.....	
1,350	135,000	.00587	.00037	.....	.....	
1,400	140,000	.00613	.00026	.....	.....	Elastic limit.
1,450	145,000	.00655	.00042	.....	.....	
1,500	150,000	.00695	.00040	.....	.....	
1,550	155,000	.00738	.00043	.....	.....	
1,600	160,000	.00810	.00072	.....	.....	
1,650	165,000	.00950	.00140	.....	.....	
1,700	170,000	.01350	.00400	.....	.....	
1,742	174,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,200
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	0.21
Elongation per inch under strain at elastic limit	do...	.00613
Reduction in area after rupture, per centum of original section		34.0
Position of rupture		3″.6 inside the gauged section
Character of broken surface		fine silky

No. 4114.

Marks No. 485.
Sectional area, ″.0994 × ″.0989 = .0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	.0	.0	0.	0.	Initial load.
196	20,000	.00072	.00072	.....	.....	
392	40,000	.00148	.00076	.....	.....	
588	60,000	.00227	.00079	.....	.....	
784	80,000	.00302	.00075	.....	.....	
980	100,000	.00382	.00080	.....	.....	
1,176	120,000	.00482	.00100	.....	.....	
1,225	125,000	.00505	.00023	.....	.....	
1,274	130,000	.00528	.00023	.....	.....	
1,323	135,000	.00568	.00040	.....	.....	
1,372	140,000	.00600	.00032	.....	.....	
1,421	145,000	.00635	.00035	.....	.....	Elastic limit.
1,470	150,000	.00683	.00048	.....	.....	
1,519	155,000	.00768	.00085	.....	.....	
1,568	160,000	.00895	.00127	.....	.....	
1,617	165,000	.01293	.00398	.....	.....	
1,666	170,000	.023	.01007	.....	.....	
1,702	173,670	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	173,670
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00635
Reduction in area after rupture, per centum of original section		39.8
Position of rupture		3″,7 outside the gauged section
Character of broken surface		fine silky

No. 4115.

Marks, No. 490.
Sectional area, ".0993 × .0997 = .0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00077	.00077	.....	.....	
396	40,000	.00162	.00085	.....	.....	
594	60,000	.00247	.00085	.....	.....	
792	80,000	.00332	.00085	.....	.....	
1,188	120,000	.00530	.00098	.....	.....	
1,237	125,000	.00550	.00020	.....	.....	
1,287	130,000	.00578	.00028	.....	.....	
1,336	135,000	.00618	.00040	.....	.....	Elastic limit.
1,386	140,000	.00660	.00042	.....	.....	
1,436	145,000	.00717	.00057	.....	.....	
1,485	150,000	.00767	.00050	.....	.....	
1,535	155,000	.00825	.00058	.....	.....	
1,584	160,000	.00937	.00112	.....	.....	
1,634	165,000	.01139	.00193	.....	.....	
1,683	170,000	.01425	.00295	.....	.....	
1,730	174,750	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,750
Elastic limit per square inch of original section	do ..	135,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00618
Reduction in area after rupture, per centum of original section		40.4
Position of rupture		3".55 inside the gauged section
Character of broken surface		fine silky

No. 4116.

Marks, No. 495.
Sectional area, ″.1000×″.1000=.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	.0	0.	0.	Initial load.
200	20,000	.00076	.00076	.....	.....	
400	40,000	.00155	.00079	.....	.....	
600	60,000	.00248	.00093	.....	.....	
800	80,000	.00328	.00080	.....	.....	
1,000	100,000	.00450	.00122	.....	.....	
1,200	120,000	.00567	.00117	.....	.....	
1,250	125,000	.00585	.00018	.....	.....	
1,300	130,000	.00620	.00035	.....	.....	
1,350	135,000	.00662	.00042	.....	.....	Elastic limit.
1,400	140,000	.00715	.00053	.....	.....	
1,450	145,000	.00785	.00070	.....	.....	
1,500	150,000	.00890	.00105	.....	.....	
1,550	155,000	.01075	.00185	.....	.....	
1,600	160,000	.01507	.00432	.....	.....	
1,641	164,100	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	164,100
Elastic limit per square inch of original section	do....	135,000
Elongation per inch after rupture	inch..	.014
Elongation per inch under strain at elastic limit	do....	.00662
Reduction in area after rupture, per centum of original section		39.0
Position of rupture		1″.2 outside the gauged section
Character of broken surface		fine silky

No. 4117.

Marks, No. 500.
Sectional area, ".0997×".0997=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00073	.00073	.....	.....	
396	40,000	.00159	.00086	.....	.....	
594	60,000	.00234	.00075	.....	.....	
792	80,000	.00322	.00088	.....	.....	
990	100,000	.00408	.00086	.....	.....	
1,188	120,000	.00502	.00094	.....	.....	
1,237	125,000	.00527	.00025	.....	.....	
1,287	130,000	.00550	.00023	.....	.....	
1,336	135,000	.00578	.00028	.....	.....	
1,386	140,000	.00608	.00030	.....	.....	
1,436	145,000	.00642	.00034	.....	.....	Elastic limit.
1,485	150,000	.00682	.00040	.....	.....	
1,535	155,000	.00738	.00056	.....	.....	
1,584	160,000	.00808	.00070	.....	.....	
1,634	165,000	.00910	.00102	.....	.....	
1,683	170,000	.01110	.00200	.....	.....	
1,733	175,060	.018	.0069	.....	.....	
1,763	178,080	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	178,080
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit	do...	.00612
Reduction in area after rupture, per centum of original section	.....	41.4
Position of rupture		4".1 inside the gauged section
Character of broken surface		fine silky

No. 4118.

Marks, No. 505.
Sectional area, ".0996×".1000=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00079	.00079			
400	40,000	.00162	.00083			
600	60,000	.00239	.00077			
800	80,000	.00315	.00076			
1,000	100,000	.00415	.00100			
1,200	120,000	.00502	.00087			
1,250	125,000	.00527	.00025			
1,300	130,000	.00550	.00023			
1,350	135,000	.00577	.00027			
1,400	140,000	.00609	.00032			
1,450	145,000	.00642	.00033			Elastic limit.
1,500	150,000	.00683	.00041			
1,550	155,000	.00727	.00044			
1,600	160,000	.00787	.00060			
1,650	165,000	.00866	.00179			
1,700	170,000	.01017	.00151			
1,750	175,000	.014	.00383			
1,800	180,000	.020	.006			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,000
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00642
Reduction in area after rupture, per centum of original section		41.0
Position of rupture		3", 4 outside the gauged section
Character of broken surface		fine silky

No. 4119.

Marks, No. 510.
Sectional area, ".1000 × ".1000 = .010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00075	.00075	.....	.....	
400	40,000	.00150	.00075	.....	.....	
600	60,000	.00224	.00074	.....	.....	
800	80,000	.00322	.00098	.....	.....	
1,000	100,000	.00397	.00075	.....	.....	
1,200	120,000	.00495	.00098	.....	.....	
1,250	125,000	.00525	.00030	.....	.....	
1,300	130,000	.00545	.00020	.....	.....	
1,350	135,000	.00564	.00019	.....	.....	
1,400	140,000	.00590	.00026	.....	.....	
1,450	145,000	.00622	.00032	.....	.....	Elastic limit.
1,500	150,000	.00665	.00043	.....	.....	
1,550	155,000	.00720	.00055	.....	.....	
1,600	160,000	.00791	.00071	.....	.....	
1,650	165,000	.00950	.00159	.....	.....	
1,700	170,000	.015	.00550	.....	.....	
1,750	175,000	.024	.009	.....	.....	
1,784	178,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	178,400
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00622
Reduction in area after rupture, per centum of original section		42.0
Position of rupture		2" inside the gauged section
Character of broken surface		fine silky

No. 4120.

Marks, No. 515.
Sectional area, ″.0982×″.0986=.0097 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00077	.00077	.....	.....	
388	40,000	.00152	.00075	.....	.....	
582	60,000	.00237	.00085	.....	.....	
776	80,000	.00322	.00085	.....	.....	
970	100,000	.00412	.00090	.....	.....	
1,164	120,000	.00515	.00103	.....	.....	
1,212	125,000	.00535	.00020	.....	.....	
1,261	130,000	.00564	.00029	.....	.....	
1,309	135,000	.00608	.00044	.....	.....	
1,358	140,000	.00630	.00022	.....	.....	
1,406	145,000	.00677	.00047	.....	.....	
1,455	150,000	.00719	.00042	.....	.....	Elastic limit.
1,503	155,000	.00787	.00068	.....	.....	
1,552	160,000	.00853	.00066	.....	.....	
1,600	165,000	.00986	.00133	.....	.....	
1,649	170,000	.01190	.00204	.....	.....	
1,697	175,000	.018	.0061	.....	.....	
1,746	180,000	.028	.010	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	180,000
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00719
Reduction in area after rupture, per centum of original section		37.1
Position of rupture		2″.3 outside the gauged section
Character of broken surface		fine silky

No. 4121.

Marks, No. 520.
Sectional area, ″.0096 × ″.1000 = .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00075	.00075	.....	.....	
400	40,000	.00158	.00083	.....	.....	
600	60,000	.00238	.00080	.....	.....	
800	80,000	.00322	.00084	.....	.....	
1,000	100,000	.00392	.00070	.....	.....	
1,200	120,000	.00481	.00089	.....	.....	
1,250	125,000	.00501	.00020	.....	.....	
1,300	130,000	.00531	.00030	.....	.....	
1,350	135,000	.00557	.00026	.....	.....	
1,400	140,000	.00592	.00035	.....	.....	
1,450	145,000	.00627	.00035	.....	.....	
1,500	150,000	.00656	.00033	.....	.....	Elastic limit.
1,550	155,000	.00705	.00045	.....	.....	
1,600	160,000	.00778	.00073	.....	.....	
1,650	165,000	.00878	.00100	.....	.....	
1,700	170,000	.01170	.00292	.....	.....	
1,750	175,000	.022	.0103	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	175,000
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.013
Elongation per inch under strain at elastic limit	do...	.00360
Reduction in area after rupture, per centum of original section		41.0
Position of rupture		″.3 outside the gauged section
Character of broken surface		fine silky

No. 4129.

Marks, No. 525.
Sectional area, ".0986×".0989=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00073	.00073			
392	40,000	.00168	.00095			
588	60,000	.00250	.00082			
784	80,000	.00311	.00061			
980	100,000	.00422	.00111			
1,176	120,000	.00500	.00078			
1,225	125,000	.00530	.00030			
1,274	130,000	.00552	.00022			
1,323	135,000	.00578	.00026			
1,372	140,000	.00617	.00039			Elastic limit.
1,421	145,000	.00682	.00065			
1,470	150,000	.00727	.00045			
1,519	155,000	.00838	.00111			
1,568	160,000	.00970	.00132			
1,617	165,000	.01235	.00265			
1,651	168,470					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,470
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00617
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		5".2 outside the gauged section
Character of broken surface		fine silky

No. 4130.

Marks No. 535.
Sectional area, ″.0998 × ″.0993 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00075	.00075	.....	.....	
396	40,000	.00165	.00090	.....	.....	
594	60,000	.00245	.00080	.....	.....	
792	80,000	.00312	.00067	.....	.....	
990	100,000	.00407	.00095	.....	.....	
1,188	120,000	.00485	.00078	.....	.....	
1,237	125,000	.00495	.00010	.....	.....	
1,287	130,000	.00512	.00017	.....	.....	
1,336	135,000	.00547	.00035	.....	.....	
1,386	140,000	.00575	.00028	.....	.....	
1,436	145,000	.00597	.00022	.....	.....	
1,485	150,000	.00639	.00042	.....	.....	
1,535	155,000	.00669	.00030	.....	.....	Elastic limit.
1,584	160,000	.00737	.00068	.....	.....	
1,634	165,000	.00842	.00105	.....	.....	
1,683	170,000	.00922	.00080	.....	.....	
1,730	174,750	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,750
Elastic limit per square inch of original section	do....	155,000
Elongation per inch after rupture	inhc..	.022
Elongation per inch under strain at elastic limit	do....	.00669
Reduction in area after rupture, per centum of original section		43.4
Position of rupture		3″.8 inside the gauged section
Character of broken surface		fine silky

No. 4131.

Marks, No. 540.
Sectional area, ".0984×".0983=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00076	.00076	.....	.....	
388	40,000	.00169	.00093	.....	.....	
582	60,000	.00247	.00078	.....	.....	
776	80,000	.00328	.00081	.....	.....	
970	100,000	.00422	.00094	.....	.....	
1,164	120,000	.00485	.00063	.....	.....	
1,212	125,000	.00516	.00031	.....	.....	
1,261	130,000	.00540	.00024	.....	.....	
1,309	135,000	.00566	.00026	.....	.....	
1,358	140,000	.00590	.00024	.....	.....	
1,406	145,000	.00620	.00030	.....	.....	
1,455	150,000	.00662	.00042	.....	.....	
1,503	155,000	.00680	.00018	.....	.....	Elastic limit.
1,552	160,000	.00738	.00058	.....	.....	
1,600	165,000	.00782	.00044	.....	.....	
1,649	170,000	.00840	.00058	.....	.....	
1,697	175,000	.00938	.00098	.....	.....	
1,746	180,000	.013	.00362	.....	.....	
1,794	185,000	.019	.006	.....	.....	
1,836	189,280	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	189,280
Elastic limit per square inch of original section	do ..	155,000
Elongation per inch after rupture	inch..	.016
Elongation per inch under strain at elastic limit	do...	.00680
Reduction in area after rupture, per centum of original section		32.0
Position of rupture		3".7 outside the gauged section
Character of broken surface		fine silky

No. 4132.

Marks, No. 545.
Sectional area, ".0990 × ".0991 = .0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00081	.00081	.....	.....	
392	40,000	.00169	.00088	.....	.....	
588	60,000	.00262	.00093	.....	.....	
784	80,000	.00345	.00083	.....	.....	
980	100,000	.00430	.00085	.....	.....	
1,176	120,000	.00526	.00096	.....	.....	
1,225	125,000	.00545	.00019	.....	.....	
1,274	130,000	.00570	.00025	.....	.....	
1,323	135,000	.00605	.00035	.....	.....	
1,372	140,000	.00642	.00037	.....	.....	Elastic limit.
1,421	145,000	.00688	.00046	.....	.....	
1,470	150,000	.00748	.00060	.....	.....	
1,519	155,000	.00845	.00097	.....	.....	
1,568	160,000	.01050	.00205	.....	.....	
1,617	165,000	.017	.00650	.....	.....	
1,660	169,390	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	169,390
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00642
Reduction in area after rupture, per centum of original section		39.8
Position of rupture		".5 outside the gauged section
Character of broken surface		fine silky

No. 4133.

Marks, No. 550.
Sectional area, ".0985×".0988=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00081	.00081	.....	.....	
392	40,000	.00167	.00086	.....	.....	
588	60,000	.00260	.00093	.....	.....	
784	80,000	.00345	.00085	.....	.....	
980	100,000	.00453	.00108	.....	.....	
1,176	120,000	.00568	.00115	.....	.....	
1,225	125,000	.00590	.00022	.....	.....	
1,274	130,000	.00631	.00041	.....	.....	Elastic limit.
1,323	135,000	.00683	.00052	.....	.....	
1,372	140,000	.00740	.00057	.....	.....	
1,421	145,000	.00811	.00071	.....	.....	
1,470	150,000	.00925	.00114	.....	.....	
1,519	155,000	.01118	.00193	.....	.....	
1,568	160,000	.014	.00282	.....	.....	
1,617	165,000	.022	.008	.....	.....	
1,638	167,140	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	167,140
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00631
Reduction in area after rupture, per centum of original section		46.9
Position of rupture		4".3 inside the gauged section
Character of broken surface		fine silky

No. 4134.

Marks, No. 555.
Sectional area, ".0994×".0995=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00079	.00079	.....	.....	
396	40,000	.00158	.00079	.....	.....	
594	60,000	.00241	.00083	.....	.....	
792	80,000	.00335	.00094	.....	.....	
990	100,000	.00428	.00093	.....	.....	
1,188	120,000	.00535	.00107	.....	.....	
1,237	125,000	.00562	.00027	.....	.....	Elastic limit.
1,287	130,000	.00608	.00046	.....	.....	
1,336	135,000	.00660	.00052	.....	.....	
1,386	140,000	.00713	.00053	.....	.....	
1,436	145,000	.00820	.00107	.....	.....	
1,485	150,000	.00922	.00102	.....	.....	
1,535	155,000	.01190	.00268	.....	.....	
1,584	160,000	.020	.0081	.....	.....	
1,618	163,430	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	163,430
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.027
Elongation per inch under strain at elastic limit	do...	.00562
Reduction in area after rupture, per centum of original section		40.4
Position of rupture		4".3 inside the gauged section
Character of broken surface		fine silky

No. 4135.

Marks, No. 560.
Sectional area, ".0986×".0991=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00083	.00083	.....	.....	
388	40,000	.00165	.00082	.....	.....	
582	60,000	.00248	.00083	.....	.....	
776	80,000	.00327	.00079	.....	.....	
970	100,000	.00432	.00105	.....	.....	
1,164	120,000	.00556	.00122	.....	.....	
1,212	125,000	.00573	.00017	.....	.....	Elastic limit.
1,261	130,000	.00620	.00047	.....	.....	
1,309	135,000	.00677	.00057	.....	.....	
1,358	140,000	.00721	.00044	.....	.....	
1,406	145,000	.00807	.00086	.....	.....	
1,455	150,000	.00895	.00088	.....	.....	
1,503	155,000	.01057	.00162	.....	.....	
1,552	160,000	.014	.00343	.....	.....	
1,600	165,000	.022	.008	.....	.....	
1,602	165,150	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	165,150
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00573
Reduction in area after rupture, per centum of original section		40.2
Position of rupture		".9 inside the gauged section
Character of broken surface		fine silky

No. 4136.

Marks, No. 565.
Sectional area, ″.0989×″.0996=″.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00080	.00080	.....	.....	
392	40,000	.00177	.00097	.....	.....	
588	60,000	.00260	.00083	.....	.....	
784	80,000	.00350	.00090	.....	.....	
980	100,000	.00458	.00108	.....	.....	
1,176	120,000	.00585	.00127	.....	.....	
1,225	125,000	.00605	.00020	.....	.....	
1,274	130,000	.00642	.00037	.....	.....	Elastic limit.
1,323	135,000	.00698	.00056	.....	.....	
1,372	140,000	.00768	.00070	.....	.....	
1,421	145,000	.00830	.00062	.....	.....	
1,470	150,000	.00945	.00115	.....	.....	
1,519	155,000	.01200	.00255	.....	.....	
1,568	160,000	.017	.005	.....	.....	
1,606	163,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	163,880
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00642
Reduction in area after rupture, per centum of original section		39.8
Position of rupture		1″.4 inside the gauged section
Character of broken surface		fine silky

No. 4137.

Marks, No. 570.
Sectional area, ″.0997×″.0996=.0099 square inch.
Gauged length, 10′.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00079	.00079	.....	.....	
396	40,000	.00170	.00091	.....	.....	
594	60,000	.00242	.00072	.....	.....	
792	80,000	.00352	.00110	.....	.....	
990	100,000	.00422	.00090	.....	.....	
1,188	120,000	.00522	.00100	.....	.....	
1,237	125,000	.00550	.00028	.....	.....	
1,287	130,000	.00568	.00018	.....	.....	
1,336	135,000	.00610	.00042	.....	.....	
1,386	140,000	.00640	.00030	.....	.....	
1,436	145,000	.00677	.00037	.....	.....	Elastic limit.
1,485	150,000	.00728	.00051	.....	.....	
1,535	155,000	.00778	.00050	.....	.....	
1,584	160,000	.00845	.00067	.....	.....	
1,634	165,000	.010	.00155	.....	.....	
1,683	170,000	.014	.004	.....	.....	
1,736	175,200	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	175,350
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00677
Reduction in area after rupture, per centum of original section		32.3
Position of rupture		4″.7 outside the gauged section
Character of broken surface		fine silky

No. 4138.

Marks, No. 575.
Sectional area, ″.0101 × ″.0100 = .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00080	.00080	.....	.....	
400	40,000	.00155	.00075	.....	.....	
600	60,000	.00225	.00070	.....	.....	
800	80,000	.00300	.00075	.....	.....	
1,000	100,000	.00390	.00090	.....	.....	
1,200	120,000	.00465	.00075	.....	.....	
1,250	125,000	.00488	.00023	.....	.....	
1,300	130,000	.00507	.00019	.....	.....	
1,350	135,000	.00524	.00017	.....	.....	
1,400	140,000	.00541	.00017	.....	.....	
1,450	145,000	.00570	.00029	.....	.....	
1,500	150,000	.00600	.00030	.....	.....	
1,550	155,000	.00628	.00028	.....	.....	
1,600	160,000	.00667	.00039	.....	.....	Elastic limit.
1,650	165,000	.00710	.00043	.....	.....	
1,700	170,000	.00771	.00061	.....	.....	
1,750	175,000	.00870	.00099	.....	.....	
1,800	180,000	.01260	.00390	.....	.....	
1,850	185,000	.020	.00740	.....	.....	
1,877	187,700	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	187,700
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	.023
Elongation per inch under strain at elastic limit	do...	.00667
Reduction in area after rupture, per centum of original section		31.0
Position of rupture		2″.3 inside the gauged section
Character of broken surface		fine silky

No. 4139.

Marks, No. 580.
Sectional area, $''.0990 \times ''.0991 = .0098$ square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00077	.00077	.....	.....	
392	40,000	.00170	.00093	.....	.....	
588	60,000	.00253	.00083	.....	.....	
784	80,000	.00315	.00062	.....	.....	
980	100,000	.00405	.00090	.....	.....	
1,176	120,000	.00480	.00075	.....	.....	
1,225	125,000	.00500	.00020	.....	.....	
1,274	130,000	.00522	.00022	.....	.....	
1,323	135,000	.00539	.00017	.....	.....	
1,372	140,000	.00567	.00028	.....	.....	
1,421	145,000	.00587	.00020	.....	.....	
1,470	150,000	.00626	.00039	.....	.....	Elastic limit.
1,519	155,000	.00681	.00055	.....	.....	
1,568	160,000	.00720	.00039	.....	.....	
1,617	165,000	.00780	.00060	.....	.....	
1,666	170,000	.00887	.00107	.....	.....	
1,715	175,000	.01130	.00243	.....	.....	
1,764	180,000	.021	.0097	.....	.....	
1,792	182,860	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	182,860
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00626
Reduction in area after rupture, per centum of original section		37.8
Position of rupture		1″.9 inside the gauged section
Character of broken surface		fine silky

No. 4140.

Marks, No. 585.
Sectional area, ″.0996×″.0996=.0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00078	.00078			
396	40,000	.00162	.00084			
594	60,000	.00240	.00078			
792	80,000	.00317	.00077			
990	100,000	.00407	.00090			
1,188	120,000	.00495	.00088			
1,237	125,000	.00512	.00017			
1,287	130,000	.00531	.00019			
1,336	135,000	.00571	.00040			
1,386	140,000	.00607	.00036			
1,436	145,000	.00641	.00034			Elastic limit.
1,485	150,000	.00691	.00050			
1,535	155,000	.00775	.00084			
1,584	160,000	.00910	.00135			
1,634	165,000	.020	.0109			
1,683	170,000	.028	.008			
1,704	172,120					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	172,120
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.018
Elongation per inch under strain at elastic limit	do...	.00641
Reduction in area after rupture, per centum of original section		41.4
Position of rupture		4″.7 outside the gauged section
Character of broken surface		fine silky

No. 4141.

Marks, 590.
Sectional area, ".0993×".0995=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00077	.00077			
396	40,000	.00167	.00090			
594	60,000	.00236	.00069			
792	80,000	.00330	.00094			
990	100,000	.00425	.00095			
1,188	120,000	.00507	.00082			
1,237	125,000	.00527	.00020			
1,287	130,000	.00547	.00020			
1,336	135,000	.00580	.00033			
1,386	140,000	.00610	.00030			Elastic limit.
1,436	145,000	.00658	.00048			
1,485	150,000	.00706	.00048			
1,535	155,000	.00778	.00072			
1,584	160,000	.00925	.00147			
1,634	165,000	.014	.00475			
1,683	170,000	.024	.010			
1,690	170,710					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	170,710
Elastic limit per square inch of original section	do	140,000
Elongation per inch after rupture	inch	.017
Elongation per inch under strain at elastic limit	do	.00610
Reduction in area after rupture, per centum of original section		38.4
Position of rupture		".8 outside the gauged section
Character of broken surface		fine silky

TABULATION OF ROUND STEEL RODS BEFORE DRAWING, SQUARE STEEL WIRE AND .1-INCH SQUARE FINISHED TINNED STEEL WIRE.

[From J. A. Roebling's Sons Company.]

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Remarks.
		Width.	Thickness.		Total.	Per sq. inch.	Total.	Per sq. inch.						
		Inch.	*Inch.*	*Sq. Inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*In.*	*Per ct.*	" *Sq. in.*	*Per ct.*		
3837	1	.216	Diam.	.036	2,016	56,000	3,734	103,720	.96	9.6	Diam. .17 = .023	36.1	Fine, silky	Samples from ends of coiled rods before drawing.
3838	2	.220	Diam.	.038	2,280	60,000	3,890	102,390	1.20	12.0	Diam. .16 = .020	47.4	do	
3839	3	.212	Diam.	.035	1,890	54,000	3,885	105,290	.97	9.7	Diam. .16 = .020	42.9	do	
3840	4	.220	Diam.	.038	2,508	66,000	3,810	100,260	1.42	14.2	Diam. .165 = .0189	50.3	do	
3841	5	.218	Diam.	.037	2,035	55,000	4,070	110,000	.82	8.2	Diam. .185 = .0269	27.3	Granular 60 per cent.; silky 40 per cent.	
3842	6	.212	Diam.	.035	2,310	66,000	3,850	110,000	.92	9.2	Diam. .160 = .0201	42.6	Fine silky	
3843	7	.218	Diam.	.037	2,516	68,000	3,816	103,140	1.24	12.4	Diam. .155 = .0177	52.2	do	
3844	8	.225	Diam.	.039	2,457	63,000	4,056	104,000	1.42	14.2	Diam. .170 = .0227	41.8	do	
3845	9	.217	Diam.	.037	2,294	62,000	3,897	105,320	1.30	13.0	Diam. .170 = .0227	38.7	do	
3846	10	.218	Diam.	.037	*2,738	74,000	4,218	114,000	1.18	11.8	Diam. .17 = .0227	38.7	do	
3807	1	.1496	.1503	.022	1,540	70,000	2,245	102,040	.10	1.0	.1002×.1002=.010	54.5	do	Samples from ends of coils after second drawing.
3808	2	.1515	.1518	.0229	1,488	65,000	2,214	96,680	.17	1.7	.1005×.1005=.0101	55.9	do	
3809	3	.1505	.1495	.0225	1,575	70,000	2,215	98,440	.06	0.6	.10 ×.10 =.0100	55.6	do	
3810	4	.1515	.1514	.0229	1,717	75,000	2,362	103,140	.35	3.5	.1008×.1008=.0102	55.4	do	
3811	5	.1500	.1505	.0225	1,800	80,000	2,420	107,560	.03	0.3	.125 ×.125 =.0156	30.7	do	
3812	6	.1512	.1506	.0228	1,482	65,000	2,318	101,670	.17	1.7	.1002×.1002=.010	56.1	do	
3813	7	.1505	.1503	.0226	1,695	75,000	2,422	107,170	.07	0.7	.097 ×.097 =.0094	58.4	do	
3814	8	.1493	.1494	.0223	1,561	70,000	2,190	98,210	.17	1.7	.099 ×.099 =.0098	56.1	do	
3815	9	.1514	.1513	.0226	1,948	85,000	2,404	105,000	.03	0.3	.110 ×.110 =.0121	47.2	do	
3816	10	.1500	.1487	.0223	1,561	70,000	2,341	105,000	.15	1.5	.102 ×.102 =.0104	53.4	do	
3817	1	.1170	.1172	.0137	1,438	105,000	2,055	150,000	.11	1.1	.090 ×.090 =.0081	40.9	do	Samples from ends of coils after third drawing.
3818	2	.1175	.1172	.0137	1,370	100,000	2,050	149,640	.12	1.2	.096 ×.096 =.0092	32.8	do	
3819	3	.1179	.1179	.0139	1,390	100,000	2,182	156,960	.20	2.0	.084 ×.084 =.0071	48.9	do	
3820	4	.1173	.1174	.0137	1,301	95,000	2,140	156,200	.20	2.0	.096 ×.096 =.0092	32.8	do	
3821	5	.1174	.1178	.0138	1,380	100,000	2,198	159,280	.11	1.1	.097 ×.097 =.0094	31.9	do	
3822	6	.1184	.1185	.0140	1,540	110,000	2,184	156,000	.22	2.2	.090 ×.090 =.0081	42 1	do	
3823	7	.1161	.1160	.0135	1,485	110,000	2,106	156,000	.07	0.7	.087 ×.087 =.0076	43.7	do	
	8	.1193	.1189	.0142	1,491	105,000	2,118	149,150	.13	1.3	.086 ×.086 =.0074	47.9	do	
	9	.1179	.1178	.0139	1,566	115,000	2,147	154,400	.17	1.7	.094 ×.094 =.0088	36.7	do	
	10	.1165	.1169	.0136	1,504	110,000	2,244	165,000	.10	1.0	.086 ×.086 =.0074	45.9		
					1,182	120,000	1,633	165,000	.07	0.7	.078 ×.078 =.0061	28.4	do	
					1,182	120,000	1,584	160,000	.03	0.3	.078 ×.078 =.0061	28.4	do	

SQUARE AND FLAT STEEL WIRE.

| | | |

.1-INCH SQUARE TINNED STEEL WIRE.

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.					
		Inch.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*	*" " Sq. in.*	*Per cent.*	
3997	15	.1002	.1001	.010	1,450	145,000	1,800	180,000	.24	2.4	.076×.076=.0058	42.0	Fine, silky.
3998	20	.0994	.0995	.0099	1,584	160,000	1,868	188,690	.27	2.7	.075×.075=.0056	43.4	Do.
3999	25	.0992	.0996	.0099	1,287	130,000	1,678	169,490	.10	1.0	.076×.076=.0058	41.4	Do.
4000	30	.0992	.0993	.0098	1,225	125,000	1,586	161,840	.17	1.7	.076×.076=.0058	40.8	Do.
4001	35	.0992	.0993	.0098	1,519	155,000	1,816	185,310	.25	2.5	.080×.080=.0064	34.7	Do.
4002	40	.1002	.1005	.010	1,450	145,000	1,760	176,000	.24	2.5	.082×.082=.0067	33.0	Do.
4003	45	.0988	.0987	.0098	1,470	150,000	1,744	177,960	.23	2.3	.079×.079=.0062	36.7	Do.
4004	50	.0983	.0985	.0097	1,358	140,000	1,683	173,510	.17	1.7	.078×.078=.0061	37.1	Do.
4005	55	.0984	.0986	.0097	1,358	140,000	1,590	163,920	.08	0.8	.080×.080=.0064	34.0	Do.
4006	60	.0992	.0994	.0098	1,323	135,000	1,647	168,060	.21	2.1	.083×.083=.0069	29.3	Do.
4007	65	.0990	.0993	.0098	1,421	145,000	1,714	174,900	.15	1.5	.080×.080=.0064	34.7	Do.
4008	70	.0985	.0994	.0098	1,470	150,000	1,684	171,840	.18	1.8	.078×.078=.0061	37.8	Do.
4009	75	.0990	.0986	.0098	1,470	150,000	1,790	182,650	.20	2.0	.078×.078=.0061	37.8	Do.
4010	80	.0990	.0993	.0098	1,372	140,000	1,746	178,260	.16	1.6	.079×.079=.0062	36.7	Do.
4011	85	.0995	.0992	.0099	1,485	150,000	1,732	174,950	.11	1.1	.075×.075=.0056	43.4	Do.
4012	90	.0982	.0983	.0096	1,344	140,000	1,650	171,875	.23	2.3	.080×.080=.0064	33.3	Do.
4013	100	.0986	.0993	.0098	1,372	140,000	1,651	168,470	.20	2.0	.082×.082=.0067	31.6	Do.
4014	110	.0988	.0990	.0098	1,421	145,000	1,682	171,630	.29	2.9	.076×.076=.0058	40.8	Do.
4015	125	.0994	.0994	.0099	1,386	140,000	1,628	164,440	.11	1.1	.081×.081=.0066	33.3	Do.
4016	130	.0984	.0991	.0097	1,552	160,000	1,816	187,220	.23	2.2	.071×.071=.0050	48.5	Do.
4017	135	.0986	.0984	.0097	1,455	150,000	1,742	179,590	.20	2.0	.081×.081=.0066	32.0	Do.
4018	140	.0976	.0985	.0096	1,392	145,000	1,616	168,330	.22	2.2	.080×.080=.0064	33.3	Do.
4019	145	.0986	.0987	.0097	1,455	150,000	1,738	179,180	.25	2.5	.075×.075=.0056	42.3	Do.
4020	150	.0987	.0986	.0097	1,309	135,000	1,682	173,400	.20	2.0	.076×.076=.0058	40.2	Do.
4021	155	.0990	.0990	.0098	1,372	140,000	1,746	178,160	.26	2.6	.078×.078=.0061	37.8	Do.
4022	165	.0983	.0986	.0097	1,358	140,000	1,594	164,230	.07	0.7	.076×.076=.0058	40.2	Do.
4023	170	.0986	.0987	.0097	1,406	145,000	1,718	177,110	.10	1.0	.076×.076=.0058	40.2	Do.
4024	175	.0984	.0985	.0097	1,358	140,000	1,700	175,260	.14	1.4	.078×.078=.0.61	37.1	Do.
4025	180	.0986	.0988	.0097	1,406	145,000	1,696	174,850	.22	2.2	.077×.077=.0059	39.2	Do.
4026	185	.0984	.0988	.0097	1,358	140,000	1,694	174,640	.24	2.4	.076×.076=.0058	40.2	Do.
4027	190	.0987	.0984	.0097	1,212	125,000	1,576	162,470	.12	1.2	.077×.077=.0059	39.2	Do.
4028	200	.0990	.0992	.0098	1,274	130,500	1,660	169,390	.10	1.0	.075×.075=.0056	42.9	Do.
4029	205	.0991	.0993	.0098	1,568	160,000	1,832	186,940	.20	2.0	.076×.076=.0058	40.8	Do.
4030	210	.0984	.0985	.0097	1,358	140,000	1,692	174,430	.07	0.7	.078×.078=.0061	32.1	Do.
4031	215	.0984	.0988	.0097	1,212	125,000	1,618	166,800	.13	1.3	.078×.078=.0061	31.1	Do.
4032	220	.0990	.0993	.0098	1,470	150,000	1,837	187,450	.24	2.4	.079×.079=.0062	36.7	Do.
4033	225	.0986	.0985	.0097	1,503	155,000	1,746	180,000	.28	2.8	.079×.079=.0062	36.1	Do.
4055	230	.0984	.0986	.0097	1,358	140,000	1,670	172,160	.10	1.0	.077×.077=.0059	39.2	Do.
4056	235	.0994	.0995	.0099	1,386	140,000	1,712	172,930	.19	1.9	.080×.080=.0064	35.4	Do.
4057	240	.0994	.0993	.0099	1,436	145,000	1,778	179,600	.20	2.0	.081×.081=.0066	33.3	Do.
4058	245	.0986	.0987	.0097	1,309	135,000	1,688	174,020	.25	2.5	.080×.080=.0064	34.0	Do.

4059	250	.0978	.0987	.0096	1,440	150,000	1,694	176,460	.10	1.0	.078×.078=.0061	36.5	Do.
4060	255	.0988	.0988	.0098	1,372	140,000	1,650	168,370	.11	1.1	.078×.078=.0061	37.8	Do.
4061	260	.0987	.0993	.0098	1,519	155,000	1,839	187,650	.22	2.2	.079×.079=.0062	36.7	Do.
4062	265	.0984	.0994	.0098	1,372	140,000	1,715	175,000	.26	2.6	.082×.082=.0067	31.6	Do.
4063	270	.0990	.0992	.0098	1,421	145,000	1,742	177,760	.26	2.6	.080×.080=.0064	34.7	Do.
4064	275	.0992	.0991	.0098	1,323	135,000	1,617	165,000	.30	3.0	.077×.077=.0059	39.8	Do.
4065	280	.0986	.0986	.0097	1,455	150,000	1,781	183,610	.20	2.0	.078×.078=.0061	37.1	Do.
4066	295	.0990	.0993	.0098	1,421	145,000	1,728	176,330	.20	2.0	.077×.077=.0059	39.8	Do.
4067	300	.0987	.0985	.0097	1,406	145,000	1,563	161,130	.10	1.0	.078×.078=.0061	37.1	Do.
4068	310	.0982	.0986	.0097	1,455	150,000	1,632	168,250	.07	0.7	.078×.078=.0061	37.1	Do.
4069	315	.0990	.0992	.0098	1,323	135,000	1,628	166,120	.12	1.2	.082×.082=.0067	31.6	Do.
4070	320	.1003	.1006	.0101	1,414	140,000	1,684	166,730	.07	0.7	.080×.080=.0064	36.6	Do.
4071	325	.0988	.0986	.0097	1,309	135,000	1,649	170,000	.13	1.3	.080×.080=.0064	34.0	Do.
4087	335	.0983	.0987	.0097	1,261	130,000	1,586	163,500	.16	1.6	.077×.077=.0059	39.2	Do.
4088	340	.0993	.0987	.0098	1,372	140,000	1,641	167,450	.28	2.8	.074×.074=.0055	43.9	Do.
4089	360	.0987	.0986	.0097	1,212	125,000	1,546	159,380	.23	2.3	.079×.079=.0062	36.1	Do.
4090	365	.0988	.0988	.0098	1,274	130,000	1,597	162,960	.17	1.7	.071×.071=.0050	49.0	Do.
4091	370	.0996	.0999	.0100	1,450	145,000	1,750	175,000	.29	2.9	.074×.074=.0055	45.0	Do.
4092	375	.0995	.0996	.0099	1,436	145,000	1,746	176,360	.17	1.7	.073×.073=.0053	46.5	Do.
4093	380	.0992	.0980	.0097	1,261	130,000	1,596	164,540	.27	2.7	.073×.073=.0053	45.4	Do.
4094	385	.0985	.0990	.0098	1,372	140,000	1,652	168,570	.24	2.4	.073×.073=.0053	45.9	Do.
4095	390	.0993	.0994	.0099	1,436	145,000	1,745	176,260	.20	2.0	.076×.076=.0058	41.4	Do.
4096	395	.0995	.0987	.0098	1,372	140,000	1,646	167,960	.22	2.2	.077×.077=.0059	39.8	Do.
4097	400	.0985	.0988	.0097	1,355	140,000	1,679	173,090	.22	2.2	.075×.075=.0056	42.3	Do.
4098	405	.0994	.0993	.0099	1,287	130,000	1,704	172,120	.21	2.1	.077×.077=.0059	40.4	Do.
4099	410	.0997	.0997	.0099	1,336	140,000	1,683	170,000	.24	2.4	.076×.076=.0058	41.4	Do.
4100	415	.0986	.0985	.0097	1,455	150,000	1,677	172,890	.17	1.7	.077×.077=.0059	39.2	Do.
4101	420	.0996	.0992	.0099	1,386	140,000	1,671	168,790	.28	2.8	.078×.078=.0061	38.4	Do.
4102	425	.0987	.0990	.0098	1,274	130,000	1,662	169,590	.27	2.7	.078×.078=.0061	37.8	Do.
4103	430	.0990	.0993	.0098	1,323	135,000	1,703	173,780	.13	1.3	.078+.078=.0061	37.8	Do.
4104	435	.0995	.0994	.0099	1,436	145,000	1,812	183,030	.14	1.4	.082×.082=.0067	32.3	Do.
4105	440	.1001	.0998	.010	1,450	145,000	1,748	174,800	.21	2.1	.076×.076=.0058	42.0	Do.
4106	445	.0986	.0983	.0097	1,406	145,000	1,649	170,000	.23	2.3	.077×.077=.0059	39.2	Do.
4107	450	.0984	.0986	.0097	1,261	130,000	1,596	164,540	.10	1.0	.077×.077=.0059	39.2	Do.
4108	455	.1002	.1000	.010	1,550	155,000	1,833	183,300	.21	2.1	.085×.085=.0072	28.0	Do.
4109	460	.1002	.0998	.010	1,500	150,000	1,788	178,800	.28	2.8	.078×.078=.0061	39.0	Do.
4110	465	.1003	.1005	.0101	1,313	130,000	1,710	169,310	.11	1.1	.078×.078=.0061	39 6	Do.
4111	470	.1003	.1001	.010	1,300	130,000	1,650	165,000	.16	1.6	.078×.078=.0061	39.0	Do.
4112	475	.1001	.0999	.010	1,400	140,000	1,689	168,900	.21	2.1	.083×.083=.0069	31.0	Do.
4113	480	.0999	.0996	.010	1,400	140,000	1,742	174,200	.21	2.1	.081×.081=.0066	34.0	Do.
4114	485	.0994	.0989	.0098	1,421	145,000	1,702	173,670	.21	2.1	.077×.077=.0059	39.8	Do.
4115	490	.0993	.0997	.0099	1,336	135,000	1,730	174,750	.20	2.0	.077×.077=.0059	40.4	Do.
4116	495	.1000	.1000	.010	1,350	135,000	1,641	164,100	.14	1.4	.078×.078=.0061	39.0	Do.
4117	500	.0997	.0997	.0099	1,436	145,000	1,763	178,080	.23	2.3	.076×.076=.0058	41.4	Do.
4118	505	.0996	.1000	.010	1,450	145,000	1,800	180,000	.11	1.1	.077×.077=.0059	41.0	Do.
4119	510	.1000	.1000	.010	1,450	145,000	1,784	178,490	.31	3.1	.076×.076=.0058	42.0	Do.
4120	515	.0982	.0986	.0097	1,455	150,000	1,746	180,000	.20	2.0	.078×.078=.0061	37.1	Do.
4121	520	.0996	.1000	.010	1,500	150,000	1,750	175,000	.13	1.3	.077×.077=.0059	41.0	Do.
4129	525	.0986	.0989	.0098	1,372	140,600	1,651	168,470	.07	0.7	.078×.078=.0061	37.8	Do.
4130	535	.0998	.0993	.0099	1,535	155,000	1,730	174,750	.22	2.2	.075×.075=.0056	43.4	Do.
4131	540	.0984	.0983	.0097	1,503	155,000	1,836	189,280	.16	1.6	.081×.081=.0066	32.0	Do.
4132	545	.0990	.0991	.0098	1,372	140,000	1,660	169,390	.21	2.1	.077×.077=.0059	39.8	Do.

.1-*INCH SQUARE TINNED STEEL WIRE*—Continued.

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.					
		Inch.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*	" " *Sq. in.*	*Per cent.*	
4133	550	.0985	.0988	.0098	1,274	130,000	1,638	167,140	.21	2.1	.072×.072=.0052	46.9	Fine, silky.
4134	555	.0994	.0995	.0099	1,237	125,000	1,618	163,430	.27	2.7	.077×.077=.0059	40.4	Do.
4135	560	.0986	.0991	.0097	1,212	125,000	1,602	165,150	.20	2.0	.076×.076=.0058	40.2	Do.
4136	565	.0989	.0996	.0098	1,274	130,000	1,606	163,880	.22	2.2	.077×.077=.0059	39.8	Do.
4137	570	.0997	.0996	.0099	1,436	145,000	1,736	175,350	.10	1.0	.082×.082=.0067	32.3	Do.
4138	575	.1010	.1000	.010	1,600	160,000	1,877	187,700	.23	2.3	.083×.083=.0069	31.0	Do.
4139	580	.0990	.0991	.0098	1,470	15 , 000	1,792	182,860	.22	2.2	.078×.078=.0061	37.8	Do.
4140	585	.0996	.0996	.0099	1,436	145,000	1,704	172,120	.18	1.8	.076×.076=.0058	41.4	Do.
4141	590	.0993	.0995	.0099.	1,386	140,000	1,690	170,710	.17	1.7	.078×.078=.0061	38.4	Do.

SQUARE AND FLAT TINNED AND UNTINNED STEEL WIRE FURNISHED BY ROWLAND A. ROBBINS.

FIRST LOT.

Coil No. 1.

TINNED WIRE—".10 SQUARE.

No. 3371.

Sectional area, ".1010×".1012=.0102 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
204	20,000	.00069	.00069			
408	40,000	.00136	.00067			
612	60,000	.00216	.00080			
663	65,000	.00234	.00018			
714	70,000	.00258	.00024			
765	75,000	.00279	.00021			
816	80,000	.00298	.00019			
867	85,000	.00326	.00028			
918	90,000	.00346	.00020			
969	95,000	.00370	.00024			
1,020	100,000	.00388	.00018			
1,071	105,000	.00416	.00028			
1,122	110,000	.00450	.00034			
1,173	115,000	.00480	.00030			
1,224	120,000	.00511	.00031			
1,275	125,000	.00548	.00037			Elastic limit.
1,326	130,000	.00590	.00042			
1,377	135,000	.00637	.00047			
1,428	140,000	.00693	.00056			
1,479	145,000	.00771	.00078			
1,530	150,000	.00864	.00093			
1,581	155,000	.00985	.00121			
1,632	160,000	.014	.00415			
1,683	165,000	.018	.004			
1,734	170,000	.025	.007			
1,742	170,780					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	170,780
Elastic limit per square inch of original section	do	125,000
Elongation per inch after rupture	inch	.017
Elongation per inch under strain at elastic limit	do	.00548
Reduction in area after rupture, per centum of original section		42.1
Position of rupture		3".4 outside the gauged section
Character of broken surface		silky

No. 3372.

Sectional area, ″.1005×″.1012=.0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
204	20,000	.00058	.00058			
408	40,000	.00123	.00065			
612	60,000	.00204	.00081			
663	65,000	.00224	.00020			
714	70,000	.00240	.00016			
765	75,000	.00262	.00022			
816	80,000	.00283	.00021			
867	85,000	.00305	.00022			
918	90,000	.00326	.00021			
969	95,000	.00346	.00020			
1,020	100,000	.00371	.00025			
1,071	105,000	.00391	.00020			
1,122	110,000	.00416	.00025			
1,173	115,000	.00440	.00024			
1,224	120,000	.00470	.00030			
1,275	125,000	.00497	.00027			
1,326	130,000	.00531	.00034			
1,377	135,000	.00563	.00032			Elastic limit.
1,428	140,000	.00603	.00040			
1,479	145,000	.00650	.00047			
1,530	150,000	.00707	.00057			
1,581	155,000	.00787	.00080			
1,632	160,000	.00905	.00118			
1,683	165,000	.01152	.00247			
1,734	170,000	.017	.00548			
1,777	174,220	.022	.005			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,220
Elastic limit per square inch of original section	do...	135,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00563
Reduction in area after rupture, per centum of original section		37.2
Position of rupture		6″.4 outside the gauged section
Character of broken surface		silky

No. 3373.

Sectional area, ″.1014×″.1009=.0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
204	20,000	.00068	.00068	.....	.....	
408	40,000	.00142	.00074	.....	.....	
612	60,000	.00224	.00082	.....	.....	
663	65,000	.00239	.00015	.....	.....	
714	70,000	.00263	.00024	.....	.....	
765	75,000	.00281	.00018	.....	.....	
816	80,000	.00303	.00022	.....	.....	
867	85,000	.00327	.00024	.....	.....	
918	90,000	.00346	.00019	.....	.....	
969	95,000	.00371	.00025	.....	.....	
1,020	100,000	.00392	.00021	.....	.....	
1,071	105,000	.00420	.00028	.....	.....	
1,122	110,000	.00448	.00028	.....	.....	
1,173	115,000	.00478	.00030	.....	.....	
1,224	120,000	.00511	.00033	.....	.....	
1,275	125,000	.00547	.00036	.....	.....	
1,326	130,000	.00583	.00036	.....	.....	Elastic limit.
1,377	135,000	.00629	.00046	.....	.....	
1,428	140,000	.00680	.00051	.....	.....	
1,479	145,000	.00760	.00080	.....	.....	
1,530	150,000	.00856	.00096	.....	.....	
1,581	155,000	.00968	.00112	.....	.....	
1,632	160,000	.01162	.00194	.....	.....	
1,683	165,000	.017	.00538	.....	.....	
1,734	170,000	.023	.006	.....	.....	
1,749	171,470	.029	.006	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	171,470
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	0.22
Elongation per inch under strain at elastic limit	do...	.00583
Reduction in area after rupture, per centum of original section		37.2
Position of rupture		at one end of gauged section
Character of broken surface		silky

Coil No. 2.

FLAT TINNED WIRE ".15×".075.

No 3374.

Sectional area ".1485×".0790=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00070	.00070			
440	40,000	.00144	.00074			
660	60,000	.00219	.00075			
715	65,000	.00240	.00021			
770	70,000	.00257	.00017			
825	75,000	.00277	.00020			
880	80,000	.00299	.00022			
935	85,000	.00315	.00016			
990	90,000	.00339	.00024			
1,045	95,000	.00354	.00015			
1,100	100,000	.00374	.00020			
1,155	105,000	.00395	.00021			
1,210	110,000	.00420	.00025			
1,265	115,000	.00442	.00022			
1,320	120,000	.00466	.00024			
1,375	125,000	.00491	.00025			
1,430	130,000	.00511	.00020			
1,485	135,000	.00541	.00030			
1,540	140,000	.00570	.00029			
1,595	145,000	.00600	.00030			
1,650	150,000	.00634	.00034			
1,705	155,000	.00668	.00034			Elastic limit.
1,760	160,000	.00718	.00050			
1,815	165,000	.00777	.00059			
1,870	170,000	.00862	.00085			
1,925	175,000	.01002	.00140			
1,980	180,000	.011	.00098			
2,035	185,000	.018	.007			
2,062	187,450	.019	.001			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	187,450
Elastic limit per square inch of original section	do..	155,000
Elongation per inch after rupture	inch..	.008
Elongation per inch under strain at elastic limit	do...	.00668
Reduction in area after rupture, per centum of original section		17.3
Position of rupture		2".4 outside the gauged section
Character of broken surface		silky

No. 3375.

Sectional area, ″.1485 × ″.0790=.011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00068	.00068			
440	40,000	.00141	.00073			
660	60,000	.00208	.00067			
715	65,000	.00227	.00019			
770	70,000	.00247	.00020			
825	75,000	.00267	.00020			
880	80,000	.00282	.00015			
935	85,000	.00308	.00026			
990	90,000	.00324	.00016			
1,045	95,000	.00343	.00019			
1,100	100,000	.00366	.00023			
1,155	105,000	.00387	.00021			
1,210	110,000	.00408	.00021			
1,265	115,000	.00431	.00023			
1,320	120,000	.00456	.00025			
1,375	125,000	.00481	.00025			
1,430	130,000	.00510	.00029			
1,485	135,000	.00535	.00025			
1,540	140,000	.00567	.00032			
1,595	145,000	.00600	.00033			
1,650	150,000	.00636	.00036			Elastic limit.
1,705	155,000	.00686	.00050			
1,760	160,000	.00730	.00044			
1,815	165,000	.00803	.00073			
1,870	170,000	.00891	.00088			
1,925	175,000	.01024	.00133			
1,980	180,000	.014	.00376			
2,035	185,000	.020	.006			
2,055	186,820	.025	.005			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	186,820
Elastic limit per square inch of original section	do...	150,000
Elongation per inch after rupture	inch..	.018
Elongation per inch under strain at elastic limit	do...	.00636
Reduction in area after rupture, per centum of original section		22.7
Position of rupture	1″.40 inside the gauged section	
Character of broken surface	silky, slightly granular	

No. 3376.

Sectional area, ".1485 × ".0786 = .011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00063	.00063	.....	.....	
440	40,000	.00125	.00062	.....	.....	
660	60,000	.00195	.00070	.....	.....	
715	65,000	.00214	.00019	.....	.....	
770	70,000	.00231	.00017	.....	.....	
825	75,000	.00251	.00020	.....	.....	
880	80,000	.00271	.00020	.....	.....	
935	85,000	.00291	.00020	.....	.....	
990	90,000	.00315	.00024	.....	.....	
1,045	95,000	.00330	.00015	.....	.....	
1,100	100,000	.00356	.00026	.....	.....	
1,155	105,000	.00376	.00020	.....	.....	
1,210	110,000	.00405	.00029	.....	.....	
1,265	115,000	.00431	.00026	.....	.....	
1,320	120,000	.00456	.00025	.....	.....	
1,375	125,000	.00486	.00030	.....	.....	
1,430	130,000	.00515	.00029	.....	.....	
1,485	135,000	.00547	.00032	.....	.....	
1,540	140,000	.00580	.00033	.....	.....	
1,595	145,000	.00613	.00033	.....	.....	Elastic limit.
1,650	150,000	.00655	.00042	.....	.....	
1,705	155,000	.00712	.00057	.....	.....	
1,760	160,000	.00765	.00053	.....	.....	
1,815	165,000	.00852	.00087	.....	.....	
1,870	170,000	.00985	.00133	.....	.....	
1,925	175,000	.013	.00315	.....	.....	
1,980	180,000	.018	.005	.....	.....	
2,035	185,000	.026	.008	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	185,000
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00613
Reduction in area after rupture, per centum of original section		15.5
Position of rupture		".6 outside the gauged section
Character of broken surface		silky, oblique

Coil No. 3.

".10 SQUARE WIRE.

No. 3677.

Sectional area, ".1015×".1003=.0102 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
204	20,000	.00076	.00076	.....	.....	
408	40,000	.00161	.00085	.....	.....	
612	60,000	.00249	.00088	.....	.....	
663	65,000	.00267	.00018	.....	.....	
714	70,000	.00294	.00027	.....	.....	
765	75,000	.00321	.00027	.....	.....	
816	80,000	.00350	.00029	.....	.....	
867	85,000	.00372	.00022	.....	.....	
918	90,000	.00402	.00030	.....	.....	
969	95,000	.00431	.00029	.....	.....	
1,020	100,000	.00461	.00030	.....	.....	
1,071	105,000	.00498	.00037	.....	.....	
1,122	110,000	.00541	.00043	.....	.....	
1,173	115,000	.00573	.00032	.....	.....	Elastic limit.
1,224	120,000	.00614	.00041	.....	.....	
1,275	125,000	.00665	.00051	.....	.....	
1,326	130,000	.00720	.00055	.....	.....	
1,377	135,000	.00780	.00060	.....	.....	
1,428	140,000	.00858	.00078	.....	.....	
1,479	145,000	.00953	.00095	.....	.....	
1,530	150,000	.01090	.00137	.....	.....	
1,581	155,000	.012	.0011	.....	.....	
1,632	160,000	.014	.002	.....	.....	
1,683	165,000	.020	.006	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	165,000
Elastic limit, per square inch of original section	do...	115,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00573
Reduction in area after rupture, per centum of original section		43.1
Position of rupture		1", 25 outside the gauged section
Character of broken surface		silky

No. 3378.

Sectional area, ″.1013×″.1003=.0102 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
204	20,000	.00079	.00079	.....	.....	
408	40,000	.00153	.00074	.....	.....	
612	60,000	.00244	.00091	.....	.....	
663	65,000	.00260	.00016	.....	.....	
714	70,000	.00289	.00029	.....	.....	
765	75,000	.00312	.00023	.....	.....	
816	80,000	.00334	.00023	.....	.....	
867	85,000	.00363	.00029	.....	.....	
918	90,000	.00388	.00025	.....	.....	
969	95,000	.00414	.00026	.....	.....	
1,020	100,000	.00454	.00040	.....	.....	
1,071	105,000	.00490	.00036	.....	.....	
1,122	110,000	.00527	.00037	.....	.....	Elastic limit.
1,173	115,000	.00571	.00044	.....	.....	
1,224	120,000	.00617	.00046	.....	.....	
1,275	125,000	.00661	.00044	.....	.....	
1,326	130,000	.00732	.00071	.....	.....	
1,377	135,000	.00794	.00062	.....	.....	
1,428	140,000	.00890	.00096	.....	.....	
1,479	145,000	.01008	.00118	.....	.....	
1,530	150,000	.012	.002	.....	.....	
1,581	155,000	.014	.002	.....	.....	
1,632	160,000	.018	.004	.....	.....	
1,668	163,530	.025	.007	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	163,530
Elastic limit per square inch of original section	do...	110,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00527
Reduction in area after rupture, per centum of original section		45.1
Position of rupture		1″.55 inside the gauged section
Character of broken surface		silky

No. 3379.

Sectional area, ".1013×".1003=.0102 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
51	5,000	0.	0.	0.	0.	Initial load.
204	20,000	.00070	.00070	.....	.....	
408	40,000	.00154	.00084	.....	.....	
612	60,000	.00242	.00088	.....	.....	
663	65,000	.00260	.00018	.....	.....	
714	70,000	.00285	.00025	.....	.....	
765	75,000	.00308	.00023	.....	.....	
816	80,000	.00333	.00025	.....	.....	
867	85,000	.00358	.00025	.....	.....	
918	90,000	.00388	.00030	.....	.....	
969	95,000	.00417	.00029	.....	.....	
1,020	100,000	.00443	.00026	.....	.....	
1,071	105,000	.00478	.00035	.....	.....	
1,122	110,000	.00512	.00034	.....	.....	
1,173	115,000	.00538	.00026	.....	.....	Elastic limit.
1,224	120,000	.00581	.00043	.....	.....	
1,275	125,000	.00621	.00040	.....	.....	
1,326	130,000	.00665	.00044	.....	.....	
1,377	135,000	.00725	.00060	.....	.....	
1,428	140,000	.00800	.00075	.....	.....	
1,479	145,000	.00879	.00079	.....	.....	
1,530	150,000	.00967	.00108	.....	.....	
1,581	155,000	.012	.00218	.....	.....	
1,632	160,000	.014	.002	.....	.....	
1,683	165,000	.018	.004	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	165,000
Elastic limit per square inch of original section	do...	115,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00538
Reduction in area after rupture, per centum of original section		43.1
Position of rupture		4" outside the gauged section
Character of broken surface		silky

Coil No. 4.

FLAT WIRE ".15×".075.

No. 3380.

Sectional area, ".1473×".0744=.0109 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
218	20,000	.00078	.00078	.....	.....	
436	40,000	.00158	.00080	.....	.....	
654	60,000	.00243	.00085	.....	.....	
709	65,000	.00263	.00020	.....	.....	
763	70,000	.00288	.00025	.....	.....	
818	75,000	.00316	.00028	.....	.....	
872	80,000	.00336	.00020	.....	.....	
927	85,000	.00365	.00029	.....	.....	
981	90,000	.00390	.00025	.....	.....	
1,036	95,000	.00415	.00025	.....	.....	
1,090	100,000	.00450	.00035	.....	.....	
1,145	105,000	.00485	.00035	.....	.....	
1,199	110,000	.00535	.00050	.....	.....	
1,254	115,000	.00560	.00025	.....	.....	Elastic limit.
1,308	120,000	.00605	.00045	.....	.....	
1,363	125,000	.00654	.00049	.....	.....	
1,417	130,000	.00709	.00055	.....	.....	
1,472	135,000	.00765	.00056	.....	.....	
1,526	140,000	.00838	.00073	.....	.....	
1,581	145,000	.00914	.00076	.....	.....	
1,635	150,000	.01024	.00110	.....	.....	
1,690	155,000	.012	.00176	.....	.....	
1,744	160,000	.014	.002	.....	.....	
1,799	165,000	.017	.003	.....	.....	
1,853	170,000	.020	.003	.....	.....	
1,897	174,040	.037	.017	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	174,040
Elastic limit per square inch of original section	do...	115,000
Elongation per inch after rupture	inch..	.029
Elongation per inch under strain at elastic limit	do ..	.00560
Reduction in area after rupture, per centum of original section		29.4
Position of rupture		".50 inside the gauged section
Character of broken surface		silky

No. 3381.

Sectional area, ".1475×".0744=.0109 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.			Initial load.
218	20,000	.00065	.00065			
436	40,000	.00145	.00080			
654	60,000	.00230	.00085			
709	65,000	.00250	.00020			
763	70,000	.00275	.00025			
818	75,000	.00300	.00025			
872	80,000	.00320	.00020			
927	85,000	.00350	.00030			
981	90,000	.00380	.00030			
1,036	95,000	.00411	.00031			
1,090	100,000	.00446	.00035			
1,145	105,000	.00484	.00038			
1,199	110,000	.00521	.00037			Elastic limit.
1,254	115,000	.00566	.00045			
1,308	120,000	.00614	.00048			
1,363	125,000	.00666	.00052			
1,417	130,000	.00723	.00057			
1,472	135,000	.00790	.00067			
1,526	140,000	.00863	.00073			
1,581	145,000	.00950	.00087			
1,635	150,000	.01076	.00126			
1,690	155,000	.013	.00224			
1,744	160,000	.015	.002			
1,799	165,000	.018	.003			
1,853	170,000	.024	.006			
1,896	173,940	.035	.011			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	173,940
Elastic limit per square inch of original section	do...	110,000
Elongation per inch after rupture	inch..	.029
Elongation per inch under strain at elastic limit	do...	.00521
Reduction in area after rupture, per centum of original section		25.7
Position of rupture		4". inside the gauged section
Character of broken surface		silky

No. 3382.

Sectional area, ″.1472 × ″.0743 = .0109 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
218	20,000	.00066	.00066	.....	.....	
436	40,000	.00148	.00082	.....	.....	
654	60,000	.00238	.00090	.....	.....	
709	65,000	.00258	.00020	.....	.....	
763	70,000	.00282	.00024	.....	.....	
818	75,000	.00307	.00025	.....	.....	
872	80,000	.00333	.00026	.....	.....	
927	85,000	.00363	.00030	.....	.....	
981	90,000	.00393	.00030	.....	.....	
1,036	95,000	.00421	.00028	.....	.....	
1,090	100,000	.00455	.00034	.....	.....	
1,145	105,000	.00493	.00038	.....	.....	
1,199	110,000	.00533	.00040	.....	.....	
1,254	115,000	.00573	.00040	.....	.....	Elastic limit.
1,308	120,000	.00623	.00050	.....	.....	
1,363	125,000	.00667	.00044	.....	.....	
1,417	130,000	.00718	.00051	.....	.....	
1,472	135,000	.00778	.00060	.....	.....	
1,526	140,000	.00855	.00077	.....	.....	
1,581	145,000	.00930	.00075	.....	.....	
1,635	150,000	.01034	.00104	.....	.....	
1,690	155,000	.012	.00166	.....	.....	
1,744	160,000	.014	.002	.....	.....	
1,799	165,000	.016	.002	.....	.....	
1,838	168,620	.018	.002	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.	168,620
Elastic limit per square inch of original section	do...	115,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00373
Reduction in area after rupture, per centum of original section		28.4
Position of rupture		″.75 outside the gauged section
Character of broken surface		silky

SECOND LOT.

Description.

Surface of wire.	Nominal dimensions.	Actual dimensions.		Weight of coil.		Diameter of curve of wire.	
		One end.	Other end.	Pounds.	Ounces.	In coil.	When released.
Tinned.	″.15×″.15	″.1506×″.1502	″.1486×″.1493	21	0	17″	32″

The wire coiled over an arbor equal in diameter to its diagonal without fracture.

The general surface of the wire was smooth and the corners rounded to about ″.01 radius.

The tinning appeared continuous without naked spots, but of excessive thickness in places.

Along one surface locally the tin was found to be ″.013 thick, and generally the coating appeared to be from ″.0003 to ″.0005 thick.

No. 3784.

Sectional area, ″.1488×″.1496=.022 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
110	5,000	0.	0.	0.	0.	Initial load.
440	20,000	.00066	.00066	.....	.....	
880	40,000	.00137	.00071	.....	.....	
1,320	60,000	.00211	.00074	.....	.....	
1,760	80,000	.00294	.00083	.....	.....	
2,200	100,000	.00388	.00094	.....	.....	
2,310	105,000	.00417	.00029	.....	.....	
2,420	110,000	.00444	.00027	.....	.....	
2,530	115,000	.00473	.00029	.....	.....	
2,640	120,000	.00507	.00034	.....	.....	Elastic limit.
2,750	125,000	.00548	.00041	.....	.....	
2,860	130,000	.00588	.00040	.....	.....	
2,970	135,000	.00638	.00050	.....	.....	
3,080	140,000	.00690	.00052	.....	.....	
3,190	145,000	.00771	.00081	.....	.....	
3,300	150,000	.00876	.00105	.....	.....	
3,410	155,000	.01029	.00153	.....	.....	
3,520	160,000	.015	.00471	.....	.....	
3,630	165,000	.020	.005	.....	.....	
3,678	167,180	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	167,180
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00507
Reduction in area after rupture, per centum of original section		27.3
Position of rupture		″.9 outside the gauged section
Character of broken surface		fine silky

No. 3785.

Sectional area, ″.1495×″.1490=.022 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
110	5,000	0.	0.	0.	0.	Initial load.
440	20,000	.00059	.00059	.....	.....	
880	40,000	.00139	.00080	.....	.....	
1,320	60,000	.00215	.00076	.....	.....	
1,760	80,000	.00305	.00090	.....	.....	
2,200	100,000	.00413	.00108	.....	.....	
2,310	105,000	.00439	.00026	.....	.....	
2,420	110,000	.00478	.00039	.....	.....	Elastic limit.
2,530	115,000	.00519	.00041	.....	.....	
2,640	120,000	.00564	.00045	.....	.....	
2,750	125,000	.00614	.00050	.....	.....	
2,860	130,000	.00671	.00057	.....	.....	
2,970	135,000	.00740	.00069	.....	.....	
3,080	140,000	.00829	.00089	.....	.....	
3,190	145,000	.00950	.00121	.....	.....	
3,300	150,000	.012	.0025	.....	.....	
3,410	155,000	.014	.002	.....	.....	
3,520	160,000	.019	.005	.....	.....	
3,630	165,000	.029	.010	.....	.....	
3,650	165,910	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	165,910
Elastic limit per square inch of original section	do...	110,000
Elongation per inch after rupture	inch..	.024
Elongation per inch under strain at elastic limit	do...	.00478
Reduction in area after rupture, per centum of original section		29.1
Position of rupture		at middle of specimen
Character of broken surface		fine silky

No. 3786.

Sectional area, ″.1486 × ″.1506 = .022 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
110	5,000	0.	0.	0.	0.	Initial load.
440	20,000	.00053	.00053	.....	.....	
880	40,000	.00128	.00075	.....	.....	
1,320	60,000	.00205	.00077	.....	.....	
1,760	80,000	.00284	.00079	.....	.....	
2,200	100,000	.00369	.00085	.....	.....	
2,310	105,000	.00398	.00029	.....	.....	
2,420	110,000	.00419	.00021	.....	.....	
2,530	115,000	.00445	.00026	.....	.....	
2,640	120,000	.00477	.00032	.....	.....	
2,750	125,000	.00505	.00028	.....	.....	
2,860	130,000	.00542	.00037	.....	.....	Elastic limit.
2,970	135,000	.00592	.00050	.....	.....	
3,080	140,000	.00628	.00036	.....	.....	
3,190	145,000	.00689	.00061	.....	.....	
3,300	150,000	.00776	.00087	.....	.....	
3,410	155,000	.00914	.00138	.....	.....	
3,520	160,000	.018	.00386	.....	.....	
3,630	165,000	.017	.004	.....	.....	
3,740	170,000	.028	.011	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	170,000
Elastic limit per square inch of original section	do...	130,000
Elongation per inch after rupture	inch..	.015
Elongation per inch under strain at elastic limit	do...	.00542
Reduction in area after rupture, per centum of original section		27.3
Position of rupture		4″.25 outside the ganged section
Character of broken surface		fine silky

TABULATION OF SQUARE AND FLAT STEEL WIRE.

[Furnished by Rowland A. Robbins.]

FIRST LOT.

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Remarks.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.	Inch.	Per cent.				
		Inch.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*			" " *Sq. inch.*	*Per ct.*		
3371	1	.1010	.1012	.0102	1,275	125,000	1,742	170,780	.17	1.7	.077×.077=.0059	42.1	Silky	Tinned coil.
3372	1	.1012	.1005	.0102	1,377	135,000	1,777	174,220	.11	1.1	.080×.080=.0064	37.2	....do	
3373	1	.1014	.1009	.0102	1,326	130,000	1,749	171,470	.22	2.2	.080×.080=.0064	37.2	....do	
3374	2	.1485	.0790	.011	1,705	155,000	2,062	187,450	.08	0.8	.140×.065=.0091	17.3	....do	Tinned coil.
3375	2	.1485	.0790	.011	1,650	150,000	2,055	186,820	.18	1.8	.130×.065=.0085	22.7	Silky slightly granular	
3376	2	.1485	.0786	.011	1,595	145,000	2,035	185,000	.12	1.2	.137×.068=.0093	15.5	Silky oblique	
3377	3	.1015	.1003	.0102	1,173	115,000	1,683	165,000	.10	1.0	.076×.076=.0058	43.1	Silky	Coil not tinned.
3378	3	.1013	.1003	.0102	1,122	110,000	1,668	163,530	.22	2.2	.075×.075=.0056	45.1	....do	
3379	3	.1013	.1003	.0102	1,173	115,000	1,683	165,000	.07	0.7	.076×.076=.0058	43.1	....do	
3380	4	.1473	.0744	.0109	1,254	115,000	1,897	174,040	.29	2.9	.128×.060=.0077	29.4	....do	Coil not tinned.
3381	4	.1475	.0744	.0109	1,199	110,000	1,896	173,940	.29	2.9	.125×.065=.0081	25.7	....do	
3382	4	.1472	.0743	.0109	1,254	115,000	1,838	168,620	.07	0.7	.130×.060=.0078	28.4	....do	

SECOND LOT.

3784	.....	.1488	.1496	.022	2,640	120,000	3,678	167,180	.12	1.2	.127×.127=.016	27.3	Fine silky	Tinned coil.
3785	.....	.1495	.1490	.022	2,420	110,000	3,650	165,910	.24	2.4	.125×.125=.0156	29.1	....do	
3786	.....	.1486	.1506	.022	2,860	130,000	3,740	170,000	.15	1.5	.127×.127=.016	27.3	....do	

ELECTRICALLY WELDED STEEL WIRE.

[Samples from coils furnished by Rowland A. Robbins.]

No. of test.	No. of coil.	Welding burr.	Size at weld.	Dimensions of wire.		Sectional area of wire.	Tensile strength.		Fracture.
				Width.	Thickness.		Total.	Per square inch.	
			" "	*Inch.*	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
3548	1	Not removed	.180 ×.170	.1006	.1010	.010	1,310	131,000	".18 from middle of welding burr. Fine silky.
3549	1	Removed	.1012×.1041	.1012	.1010	.011	1,394	126,730	".10 from weld. Fine silky.
3550	1	....do	.1012×.1048	.1008	.1006	.010	1,327	132,700	At the weld. Granular.
3551	1	....do	.1015×.1047	.1006	.1021	.010	1,269	126,900	".18 from the weld. Fine silky.
3552	1	....do	.1020×.1008	.1006	.1003	.010	1,363	136,300	".16 from the weld. Fine silky.
3553	2	Not removed	.215 ×.147	.1490	.0785	.012	1,602	133,500	".25 from middle of welding burr. Fine silky.
3554	2	Removed	.149 ×.075	.1490	.0780	.012	1,574	131,170	At the weld. Granular.
3555	2	... do	.1502×.0787	.1490	.0780	.012	1,647	137,250	Do.
3556	2	....do	.1500×.0775	.1495	.0780	.012	1,718	143,170	".22 from the weld. Granular, silky center.
3557	2	....do	.1483×.0786	.1495	.0780	.012	1,686	140,500	".20 from the weld. Granular, silky center.
3558	3	Not removed	.170 ×.180	.1004	.1003	.010	1,274	127,400	".15 from middle of welding burr. Fine, silky.
3559	3	Removed	.1004×.1005	.1003	.1005	.010	1,090	109,000	At the weld. Granular; dull colored corner.
3560	3	....do	.1007×.0990	.1003	.1004	.010	1,153	115,300	At the weld. Granular in part; dull silky.
3561	3	....do	.1004×.0996	.1003	.1002	.010	968	96,800	Do.
3562	3	....do	.1005×.0996	.1004	.1004	.010	1,105	110,500	At or near the weld. Silky, with granular center.
3563	4	Not removed	.220 ×.160	.1487	.0742	.011	1,608	146,180	".22 from middle of welding burr. Fine silky.
3564	4	Removed	.1473×.0743	.1486	.0740	.011	1,020	92,730	At the weld. Granular, dull silky at one edge.
3565	4	....do	.1481×.0745	.1490	.0740	.011	1,092	99,270	At or near the weld. Granular, dull silky at one edge.
3566	4	....do	.1483×.0744	.1484	.0740	.011	1,464	133,090	At or near the weld. Granular, radiating from a silky spot at corner.
3567	4	....do	.1492×.0748	.1490	.0743	.011	1,395	126,820	At or near the weld. Granular.

SQUARE AND FLAT TINNED AND UNTINNED STEEL WIRE FROM R. H. WOLFF & CO., LIMITED.

FIRST LOT.

Coil No. 1. *Weight,* 58½ *pounds.*

".10 SQUARE WIRE.

No 3146.

Sectional area, ".0994 × ".0994 = .0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00064	.00064	.....	.....	
392	40,000	.00144	.00080	.00004	.00004	
588	60,000	.00224	.00080	.....	.....	
784	80,000	.00304	.00080	.....	.....	
980	100,000	.00396	.00092	.00025	.00021	
1,029	105,000	.00427	.00031	.....	.....	
1,078	110,000	.00450	.00023	.....	.....	
1,127	115,000	.00476	.00026	.....	.....	
1,176	120,000	.00503	.00027	.....	.....	
1,225	125,000	.00530	.00027	.....	.....	
1,274	130,000	.00559	.00029	.....	.....	
1,323	135,000	.00594	.00035	.....	.....	
1,372	140,000	.00624	.00030	.....	.....	
1,421	145,000	.00662	.00038	.....	.....	
1,470	150,000	.00695	.00033	.....	.....	
1,519	155,000	.00739	.00044	.....	.....	
1,568	160,000	.00769	.00030	.....	.....	Elastic limit.
1,617	165,000	.00817	.00048	.....	.....	
1,666	170,000	.00869	.00052	.....	.....	
1,715	175,000	.00914	.00045	.....	.....	
1,764	180,000	.00968	.00054	.....	.....	
1,813	185,000	.01032	.00064	.....	.....	
1,862	190,000	.01106	.00074	.....	.....	
1,911	195,000	.013	.00194	.....	.....	
1,960	200,000	.014	.001	.....	.....	
2,009	205,000	.015	.001	.....	.....	
2,058	210,000	.017	.002	.....	.....	
2,107	215,000	.019	.002	.....	.....	
2,148	219,180	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	219,180
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	.009
Elongation per inch under strain at elastic limit	do...	.00769
Reduction in area after rupture, per centum of original section		34.7
Position of rupture		4".5 outside the gauged section
Character of broken surface		fine silky

No. 3147.

Sectional area, ".0994×".0994=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00068	.00068	.....	.....	
392	40,000	.00144	.00076	.....	.....	
588	60,000	.00220	.00076	.....	.....	
784	80,000	.00300	.00080	.....	.....	
980	100,000	.00389	.00089	.....	.....	
1,029	105,000	.00408	.00019	.....	.....	
1,078	110,000	.00433	.00025	.....	.....	
1,127	115,000	.00459	.00026	.....	.....	
1,176	120,000	.00485	.00026	.....	.....	
1,225	125,000	.00513	.00028	.....	.....	
1,274	130,000	.00539	.00026	.....	.....	
1,323	135,000	.00568	.00029	.....	.....	
1,372	140,000	.00599	.00031	.....	.....	
1,421	145,000	.00629	.00030	.....	.....	
1,470	150,000	.00662	.00033	.....	.....	
1,519	155,000	.00699	.00037	.....	.....	
1,568	160,000	.00737	.00038	.....	.....	
1,617	165,000	.00772	.00035	.....	.....	Elastic limit.
1,666	170,000	.00814	.00042	.....	.....	
1,715	175,000	.00859	.00045	.....	.....	
1,764	180,000	.00907	.00048	.....	.....	
1,813	185,000	.00958	.00051	.....	.....	
1,862	190,000	.01020	.00062	.....	.....	
1,911	195,000	.01089	.00069	.....	.....	
1,960	200,000	.01170	.00081	.....	.....	
2,009	205,000	.012	.00130	.....	.....	
2,058	210,000	.014	.001	.....	.....	
2,107	215,000	.016	.002	.....	.....	
2,156	220,000	.021	.005	.....	.....	
2,176	222,040	.024	.003	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	222,040
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.014
Elongation per inch under strain at elastic limit	do...	.00772
Reduction in area after rupture, per centum of original section		34.7
Position of rupture		near middle of gauged section
Character of broken surface		fine silky

No. 3148.

Sectional area, ″.0994×″.0994=.0098 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00063	.00063	.....	.....	
392	40,000	.00148	.00085	.....	.....	
588	60,000	.00223	.00075	.....	.....	
784	80,000	.00312	.00089	.....	.....	
980	100,000	.00398	.00086	.....	.....	
1,029	105,000	.00418	.00020	.....	.....	
1,078	110,000	.00442	.00024	.....	.....	
1,127	115,000	.00467	.00025	.....	.....	
1,176	120,000	.00491	.00024	.....	.....	
1,225	125,000	.00517	.00026	.....	.....	
1,274	130,000	.00542	.00025	.....	.....	
1,323	135,000	.00572	.00030	.....	.....	
1,372	140,000	.00597	.00025	.....	.....	
1,421	145,000	.00622	.00025	.....	.....	
1,470	150,000	.00655	.00033	.....	.....	
1,519	155,000	.00683	.00028	.....	.....	
1,568	160,000	.00717	.00034	.....	.....	
1,617	165,000	.00749	.00032	.....	.....	
1,666	170,000	.00784	.00035	.....	.....	
1,715	175,000	.00822	.00031	.....	.....	Elastic limit.
1,764	180,000	.00866	.00044	.....	.....	
1,813	185,000	.00914	.00048	.....	.....	
1,862	190,000	.00966	.00052	.....	.....	
1,911	195,000	.01038	.00072	.....	.....	
1,960	200,000	.01127	.00089	.....	.....	
2,009	205,000	.012	.00073	.....	.....	
2,058	210,000	.014	.002	.....	.....	
2,107	215,000	.015	.001	.....	.....	
2,156	220,000	.020	.005	.....	.....	
2,167	221,120	.026	.006	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	221,120
Elastic limit, per square inch of original section	do...	175,000
Elongation per inch after rupture	inch..	.008
Elongation per inch under strain at elastic limit	do...	.00822
Reduction in area after rupture, per centum of original section		42.9
Position of rupture		1″.85 outside the gauged section
Character of broken surface		fine, silky

Coil No. 2. Weight 51 pounds.

".10 SQUARE WIRE.

No. 3149.

Section area, ".0991×".0991=.0098 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
196	20,000	.00068	.00068	.....	.....	
392	40,000	.00143	.00075	.....	.....	
588	60,000	.00222	.00079	.....	.....	
784	80,000	.00307	.00085	.....	.....	
980	100,000	.00394	.00087	.....	.....	
1,029	105,000	.00415	.00021	.....	.....	
1,078	110,000	.00437	.00022	.....	.....	
1,127	115,000	.00464	.00027	.....	.....	
1,176	120,000	.00489	.00025	.....	.....	
1,225	125,000	.00517	.00028	.....	.....	
1,274	130,000	.00547	.00030	.....	.....	
1,323	135,000	.00574	.00027	.....	.....	
1,372	140,000	.00606	.00032	.....	.....	
1,421	145,000	.00637	.00031	.....	.....	
1,470	150,000	.00668	.00031	.....	.....	
1,519	155,000	.00708	.00040	.....	.....	
1,568	160,000	.00743	.00035	.....	.....	
1,617	165,000	.00781	.00038	.....	.....	Elastic limit.
1,666	170,000	.00822	.00041	.....	.....	
1,715	175,000	.00872	.00050	.....	.....	
1,764	180,000	.00922	.00050	.....	.....	
1,813	185,000	.00978	.00056	.....	.....	
1,862	190,000	.01050	.00072	.....	.....	
1,911	195,000	.01127	.00077	.....	.....	
1,960	200,000	.01227	.00100	.....	.....	
2,009	205,000	.013	.00073	.....	.....	
2,058	210,000	.015	.001	.....	.....	
2,107	215,000	.019	.004	.....	.....	
2,142	218,570	.025	.006	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	218,570
Elastic limit per square inch of original section	do	165,000
Elongation per inch after rupture	inch	.013
Elongation per inch under strain at elastic limit	do	.00781
Reduction in area after rupture, per centum of original section		29.6
Position of rupture		".65 inside the gauged section
Character of broken surface		fine silky

No. 3150.

Sectional area, ".0988×".0988=".0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00067	.00067			
388	40,000	.00145	.00078			
582	60,000	.00222	.00077			
776	80,000	.00307	.00085			
970	100,000	.00398	.00091			
1,018	105,000	.00414	.00016			
1,067	110,000	.00440	.00026			
1,115	115,000	.00467	.00027			
1,164	120,000	.00494	.00027			
1,212	125,000	.00522	.00028			
1,261	130,000	.00550	.00028			
1,309	135,000	.00577	.00027			
1,358	140,000	.00604	.00027			
1,406	145,000	.00638	.00034			
1,455	150,000	.00670	.00032			
1,503	155,000	.00707	.00037			
1,552	160,000	.00740	.00033			
1,600	165,000	.00777	.00037			Elastic limit.
1,649	170,000	.00817	.00040			
1,697	175,000	.00868	.00051			
1,746	180,000	.00948	.00080			
1,794	185,000	.00990	.00042			
1,843	190,000	.01058	.00068			
1,891	195,000	.01150	.00092			
1,940	200,000	.01265	.00115			
1,988	205,000	.014	.00135			
2,037	210,000	.015	.001			
2,085	215,000	.019	.004			
2,112	217,730	.026	.007			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	217,730
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00777
Reduction in area after rupture, per centum of original section		28.9
Position of rupture		2".5 inside the gauged section
Character of broken surface		fine silky

No. 3151.

Sectional area ".0989 × ".0987=.0097 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48	5,000	0.	0.	0.	0.	Initial load.
194	20,000	.00068	.00068	.....	.....	
388	40,000	.00143	.00075	.....	.....	
582	60,000	.00222	.00079	.....	.....	
776	80,000	.00302	.00080	.....	.....	
970	100,000	.00392	.00090	.....	.....	
1,018	105,000	.00411	.00019	.....	.....	
1,067	110,000	.00432	.00021	.....	.....	
1,115	115,000	.00461	.00029	.....	.....	
1,164	120,000	.00486	.00025	.....	.....	
1,212	125,000	.00512	.00026	.....	.....	
1,261	130,000	.00542	.00030	.....	.....	
1,309	135,000	.00567	.00025	.....	.....	
1,358	140,000	.00599	.00032	.....	.....	
1,406	145,000	.00627	.00028	.....	.....	
1,455	150,000	.00668	.00041	.....	.....	
1,503	155,000	.00701	.00033	.....	.....	
1,552	160,000	.00737	.00036	.....	.....	
1,600	165,000	.00772	.00035	.....	.....	Elastic limit.
1,649	170,000	.00813	.00041	.....	.....	
1,697	175,000	.00861	.00048	.....	.....	
1,746	180,000	.00915	.00054	.....	.....	
1,794	185,000	.00972	.00057	.....	.....	
1,843	190,000	.01048	.00076	.....	.....	
1,891	195,000	.01123	.00075	.....	.....	
1,940	200,000	.01246	.00123	.....	.....	
1,988	205,000	.014	.00154	.....	.....	
2,037	210,000	.016	.002	.....	.....	
2,085	215,000	.018	.002	.....	.....	
2,128	219,380	.021	.003	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	219,380
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00772
Reduction in area after rupture, per centum of original section		25.8
Position of rupture		at one extremity of gauged section
Character of broken surface		fine silky

Coil No. 3. Weight, 50 pounds.

FLAT WIRE.

No. 3152.

Sectional area, ″.1490 × ″.0744 = .011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00062	.00062	.....	.....	
440	40,000	.00136	.00074	.....	.....	
660	60,000	.00210	.00074	.....	.....	
880	80,000	.00295	.00085	.....	.....	
1,100	100,000	.00380	.00085	.....	.....	
1,155	105,000	.00403	.00023	.....	.....	
1,210	110,000	.00425	.00022	.....	.....	
1,265	115,000	.00448	.00023	.....	.....	
1,320	120,000	.00471	.00023	.....	.....	
1,375	125,000	.00496	.00025	.....	.....	
1,430	130,000	.00523	.00027	.....	.....	
1,485	135,000	.00545	.00022	.....	.....	
1,540	140,000	.00570	.00025	.....	.....	
1,595	145,000	.00595	.00025	.....	.....	
1,650	150,000	.00623	.00028	.....	.....	
1,705	155,000	.00651	.00028	.....	.....	
1,760	160,000	.00681	.00030	.....	.....	
1,815	165,000	.00707	.00026	.....	.....	
1,870	170,000	.00741	.00034	.....	.....	
1,925	175,000	.00773	.00032	.....	.....	
1,980	180,000	.00810	.00037	.....	.....	
2,035	185,000	.00846	.00036	.....	.....	Elastic limit.
2,090	190,000	.00903	.00057	.....	.....	
2,145	195,000	.00963	.00060	.....	.....	
2,210	200,000	.01040	.00077	.....	.....	
2,255	205,000	.01110	.00070	.....	.....	
2,310	210,000	.01260	.00150	.....	.....	
2,365	215,000	.015	.00240	.....	.....	
2,420	220,000	.017	.002	.....	.....	
2,475	225,000	.020	.003	.....	.....	
2,512	228,360	.025	.005	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	228,360
Elastic limit per square inch of original section	do...	185,000
Elongation per inch after rupture	inch..	.014
Elongation per inch under strain at elastic limit	do...	.00846
Reduction in area after rupture, per centum of original section		29.1
Position of rupture		2″.5 inside the gauged section
Character of broken surface		fine silky

No. 3153.

Sectional area, ″.1490 × ″.0744 = .011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00068	.00068			
440	40,000	.00139	.00071			
660	60,000	.00212	.00073			
880	80,000	.00292	.00080			
1,100	100,000	.00378	.00086			
1,155	105,000	.00399	.00021			
1,210	110,000	.00422	.00023			
1,265	115,000	.00445	.00023			
1,320	120,000	.00469	.00024			
1,375	125,000	.00495	.00026			
1,430	130,000	.00519	.00024			
1,485	135,000	.00544	.00025			
1,540	140,000	.00569	.00025			
1,595	145,000	.00594	.00025			
1,650	150,000	.00624	.00030			
1,705	155,000	.00650	.00026			
1,760	160,000	.00679	.00029			
1,815	165,000	.00709	.00030			
1,870	170,000	.00742	.00033			
1,925	175,000	.00775	.00033			
1,980	180,000	.00809	.00034			
2,035	185,000	.00845	.00036			Elastic limit.
2,090	190,000	.00889	.00044			
2,145	195,000	.00945	.00056			
2,200	200,000	.01005	.00060			
2,255	205,000	.01088	.00083			
2,310	210,000	.01210	.00122			
2,365	215,000	.014	.00190			
2,420	220,000	.016	.002			
2,475	225,000	.018	.002			
2,530	230,000	.023	.005			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	230,000
Elastic limit per square inch of original section	do...	185,000
Elongation per inch after rupture	inch..	.006
Elongation per inch under strain at elastic limit	do...	.00845
Reduction in area after rupture, per centum of original section		32.7
Position of rupture		8″.25 outside the gauged section
Character of broken surface		fine silky

No. 3154.

Sectional area, ".1490×".0744=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00072	.00072	.....	.....	
440	40,000	.00147	.00075	.....	.....	
660	60,000	.00222	.00075	.....	.....	
880	80,000	.00307	.00085	.....	.....	
1,100	100,000	.00393	.00086	.....	.....	
1,155	105,000	.00415	.00022	.....	.....	
1,210	110,000	.00437	.00023	.....	.....	
1,265	115,000	.00462	.00025	.....	.....	
1,320	120,000	.00487	.00025	.....	.....	
1,375	125,000	.00512	.00025	.....	.....	
1,430	130,000	.00537	.00025	.....	.....	
1,485	135,000	.00562	.00025	.....	.....	
1,540	140,000	.00587	.00027	.....	.....	
1,595	145,000	.00611	.00024	.....	.....	
1,650	150,000	.00638	.00027	.....	.....	
1,705	155,000	.00668	.00030	.....	.....	
1,760	160,000	.00693	.00025	.....	.....	
1,815	165,000	.00727	.00034	.....	.....	
1,870	170,000	.00757	.00030	.....	.....	
1,925	175,000	.00786	.00029	.....	.....	
1,980	180,000	.00821	.00035	.....	.....	
2,035	185,000	.00860	.00039	.....	.....	Elastic limit.
2,090	190,000	.00908	.00048	.....	.....	
2,145	195,000	.00961	.00053	.....	.....	
2,200	200,000	.01037	.00076	.....	.....	
2,255	205,000	.01120	.00083	.....	.....	
2,310	210,000	.01250	.00130	.....	.....	
2,365	215,000	.014	.00150	.....	.....	
2,420	220,000	.016	.002	.....	.....	
2,475	225,000	.020	.004	.....	.....	
2,508	228,000	.027	.007	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	228,000
Elastic limit per square inch of original section	do...	185,000
Elongation per inch after rupture	inch..	.017
Elongation per inch under strain at elastic limit	do...	.00860
Reduction in area after rupture, per centum of original section		27.3
Position of rupture		1" inside the gauged section
Character of broken surface		fine silky

Coil No. 4. Weight 54 pounds.

FLAT WIRE.

No. 3155.

Sectional area, ".1483×".0740=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00070	.00070	.....	.....	
440	40,000	.00142	.00072	.....	.....	
660	60,000	.00222	.00080	.....	.....	
880	80,000	.00303	.00081	.....	.....	
1,100	100,000	.00388	.00085	.....	.....	
1,155	105,000	.00410	.00022	.....	.....	
1,210	110,000	.00432	.00022	.....	.....	
1,265	115,000	.00453	.00021	.....	.....	
1,320	120,000	.00479	.00026	.....	.....	
1,375	125,000	.00500	.00021	.....	.....	
1,430	130,000	.00524	.00024	.....	.....	
1,485	135,000	.00548	.00024	.....	.....	
1,540	140,000	.00572	.00024	.....	.....	
1,595	145,000	.00598	.00026	.....	.....	
1,650	150,000	.00622	.00024	.....	.....	
1,705	155,000	.00648	.00026	.....	.....	
1,760	160,000	.00678	.00030	.....	.....	
1,815	165,000	.00708	.00030	.....	.....	
1,870	170,000	.00738	.00030	.....	.....	
1,925	175,000	.00771	.00033	.....	.....	
1,980	180,000	.00808	.00037	.....	.....	Elastic limit.
2,035	185,000	.00851	.00043	.....	.....	
2,090	190,000	.00911	.00060	.....	.....	
2,145	195,000	.00979	.00068	.....	.....	
2,200	200,000	.01062	.00083	.....	.....	
2,255	205,000	.01168	.00106	.....	.....	
2,310	210,000	.01322	.00154	.....	.....	
2,365	215,000	.015	.00178	.....	.....	
2,420	220,000	.019	.004	.....	.....	
2,445	222,270	.022	.003	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	222,270
Elastic limit per square inch of original section	do...	180,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00808
Reduction in area after rupture, per centum of original section		29.1
Position of rupture		1".4 outside the gauged section
Character of broken surface		fine silky

No. 3156.

Sectional area, ".1483×".0740=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00062	.00062	.....	.....	
440	40,000	.00137	.00075	.....	.....	
660	60,000	.00212	.00075	.....	.....	
880	80,000	.00295	.00083	.....	.....	
1100	100,000	.00381	.00086	.....	.....	
1155	105,000	.00408	.00027	.....	.....	
1210	110,000	.00430	.00022	.....	.....	
1265	115,000	.00450	.00020	.....	.....	
1320	120,000	.00471	.00021	.....	.....	
1375	125,000	.00498	.00027	.....	.....	
1430	130,000	.00522	.00024	.....	.....	
1485	135,000	.00548	.00026	.....	.....	
1540	140,000	.00576	.00028	.....	.....	
1595	145,000	.00600	.00024	.....	.....	
1650	150,000	.00628	.00028	.....	.....	
1705	155,000	.00658	.00030	.....	.....	
1760	160,000	.00690	.00032	.....	.....	
1815	165,000	.00723	.00033	.....	.....	
1870	170,000	.00758	.00035	.....	.....	Elastic limit.
1925	175,000	.00800	.00042	.....	.....	
1980	180,000	.00846	.00046	.....	.....	
2035	185,000	.00898	.00052	.....	.....	
2090	190,000	.00953	.00055	.....	.....	
2145	195,000	.01033	.00080	.....	.....	
2200	200,000	.01149	.00116	.....	.....	
2255	205,000	.01250	.00101	.....	.....	
2310	210,000	.015	.00250	.....	.....	
2365	215,000	.019	.004	.....	.....	
2412	219,270	.023	.004	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	219,270
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00758
Reduction in area after rupture, per centum of original section		26.4
Position of rupture		5".5 outside the gauged section
Character of broken surface		fine silky

No. 3157.

Sectional area, ".1483×".0740=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00071	.00071	.....	.....	
440	40,000	.00148	.00077	.....	.....	
660	60,000	.00228	.00080	.....	.....	
880	80,000	.00308	.00080	.....	.....	
1,100	100,000	.00391	.00083	.....	.....	
1,155	105,000	.00412	.00021	.....	.....	
1,210	110,000	.00433	.00021	.....	.....	
1,265	115,000	.00458	.00025	.....	.....	
1,320	120,000	.00483	.00025	.....	.....	
1,375	125,000	.00507	.00024	.....	.....	
1,430	130,000	.00532	.00025	.....	.....	
1,485	135,000	.00558	.00026	.....	.....	
1,540	140,000	.00585	.00027	.....	.....	
1,595	145,000	.00613	.00028	.....	.....	
1,650	150,000	.00640	.00027	.....	.....	
1,705	155,000	.00675	.00035	.....	.....	
1,760	160,000	.00708	.00033	.....	.....	
1,815	165,000	.00740	.00032	.....	.....	
1,870	170,000	.00776	.00036	.....	.....	Elastic limit.
1,925	175,000	.00817	.00041	.....	.....	
1,980	180,000	.00861	.00044	.....	.....	
2,035	185,000	.00905	.00044	.....	.....	
2,090	190,000	.00968	.00063	.....	.....	
2,145	195,000	.01043	.00075	.....	.....	
2,200	200,000	.01122	.00079	.....	.....	
2,255	205,000	.01238	.00116	.....	.....	
2,310	210,000	.014	.00162	.....	.....	
2,365	215,000	.016	.002	.....	.....	
2,420	220,000	.021	.005	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	220,000
Elastic limit per square inch of original section	do ..	170,000
Elongation per inch after rupture	inch..	.009
Elongation per inch under strain at elastic limit	do...	.00776
Reduction in area after rupture, per centum of original section		34.5
Position of rupture		1".15 outside the gauged section
Character of broken surface		fine silky

SECOND LOT.

Coil No. 1.

".15 SQUARE WIRE.

No. 3386.

Sectional area, ".1474×".1474=.0217 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
434	20,000	.00059	.00059	.....	.....	
868	40,000	.00138	.00079	.....	.....	
1,302	60,000	.00221	.00083	.....	.....	
1,736	80,000	.00313	.00092	.....	.....	
2,170	100,000	.00418	.00105	.....	.....	
2,278	105,000	.00446	.00028	.....	.....	
2,387	110,000	.00471	.00025	.....	.....	
2,495	115,000	.00503	.00032	.....	.....	
2,604	120,000	.00536	.00033	.....	.....	
2,712	125,000	.00568	.00032	.....	.....	
2,821	130,000	.00609	.00041	.....	.....	
2,929	135,000	.00646	.00037	.....	.....	Elastic limit.
3,038	140,000	.00688	.00042	.....	.....	
3,146	145,000	.00733	.00045	.....	.....	
3,255	150,000	.00788	.00055	.....	.....	
3,363	155,000	.00851	.00063	.....	.....	
3,472	160,000	.00933	.00082	.....	.....	
3,580	165,000	.01046	.00113	.....	.....	
3,689	170,000	.013	.00254	.....	.....	
3,797	175,000	.016	.003	.....	.....	
3,906	180,000	.019	.003	.....	.....	
4,006	184,610	.027	.008	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	184,610
Elastic limit per square inch of original section	do...	135,000
Elongation per inch after rupture	inch..	.0 2
Elongation per inch under strain at elastic limit	do...	.00646
Reduction in area after rupture, per centum of original section		30.4
Position of rupture		½" inside the gauged section
Character of broken surface		silky

No. 3387.

Sectional area, ".1472×".1472=.0217 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
434	20,000	.00061	.00061	.....	.....	
868	40,000	.00138	.00077	.....	.....	
1,302	60,000	.00227	.00089	.....	.....	
1,736	80,000	.00320	.00093	.....	.....	
2,170	100,000	.00420	.00100	.....	.....	
2,278	105,000	.00440	.00020	.....	.....	
2,387	110,000	.00470	.00030	.....	.....	
2,495	115,000	.00497	.00027	.....	.....	
2,604	120,000	.00527	.00030	.....	.....	
2,712	125,000	.00557	.00030	.....	.....	
2,821	130,000	.00590	.00033	.....	.....	
2,927	135,000	.00622	.00032	.....	.....	
3,038	140,000	.00660	.00038	.....	.....	Elastic limit.
3,146	145,000	.00703	.00043	.....	.....	
3,255	150,000	.00749	.00046	.....	.....	
3,363	155,000	.00807	.00058	.....	.....	
3,472	160,000	.00880	.00073	.....	.....	
3,580	165,000	.00985	.00105	.....	.....	
3,689	170,000	.0115	.00165	.....	.....	
3,797	175,000	.013	.0015	.....	.....	
3,906	180,000	.017	.004	.....	.....	
4,016	185,000	.022	.005	.....	.....	
4,048	186,540	.027	.005	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	186,540
Elastic limit per square inch of original section	do...	140,000
Elongation per inch after rupture	inch..	.018
Elongation per inch under strain at elastic limit	do...	.00660
Reduction in area after rupture, per centum of original section		32.8
Position of rupture		½" inside the gauged section
Character of broken surface		silky

No. 3388.

Sectional area ".1472 × ".1474=.0217 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
108	5,000	0.	0.	0.	0.	Initial load.
434	20,000	.00069	.00069	.....	.....	
868	40,000	.00148	.00079	.....	.....	
1,302	60,000	.00232	.00084	.....	.....	
1,736	80,000	.00322	.00090	.....	.....	
2,170	100,000	.00433	.00111	.....	.....	
2,278	105,000	.00462	.00030	.....	.....	
2,387	110,000	.00500	.00037	.....	.....	
2,495	115,000	.00532	.00032	.....	.....	
2,604	120,000	.00572	.00040	.....	.....	Elastic limit.
2,712	125,000	.00616	.00044	.....	.....	
2,821	130,000	.00663	.00047	.....	.....	
2,927	135,000	.00710	.00047	.....	.....	
3,038	140,000	.00763	.00100	.....	.....	
3,146	145,000	.00828	.00065	.....	.....	
3,255	150,000	.00894	.00066	.....	.....	
3,363	155,000	.00982	.00088	.....	.....	
3,472	160,000	.01090	.00108	.....	.....	
3,580	165,000	.013	.00210	.....	.....	
3,689	170,000	.016	.003	.....	.....	
3,797	175,000	.018	.002	.....	.....	
3,906	180,000	.022	.004	.....	.....	
3,997	184,190	.033	.011	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	184,190
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.033
Elongation per inch under strain at elastic limit	do...	.00572
Reduction in area after rupture, per centum of original section		31.3
Position of rupture		4."2 inside the gauged section
Character of broken surface		silky

Coil 2.

Flat wire, ".1492×".0741=.011 square inch.

No. 3389.

Sectional area, ".1492×".0741=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00050	.00050			
440	40,000	.00124	.00074			
660	60,000	.00204	.00080			
880	80,000	.00290	.00086			
1,100	100,000	.00380	.00090			
1,155	105,000	.00400	.00020			
1,210	110,000	.00423	.00023			
1,265	115,000	.00449	.00026			
1,320	120,000	.00475	.00026			
1,375	125,000	.00500	.00025			
1,430	130,000	.00530	.00030			
1,485	135,000	.00555	.00025			
1,540	140,000	.00590	.00035			
1,595	145,000	.00618	.00028			
1,650	150,000	.00650	.00032			
1,705	155,000	.00682	.00032			
1,760	160,000	.00720	.00038			Elastic limit.
1,815	165,000	.00765	.00045			
1,870	170,000	.00820	.00055			
1,925	175,000	.00900	.00080			
1,980	180,000	.01015	.00115			
2,035	185,000	.012	.00185			
2,090	190,000	.016	.004			
2,145	195,000	.020	.004			
2,178	198,000	.027	.007			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	198,000
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00720
Reduction in area after rupture, per centum of original section		20.0
Position of rupture	9".75 outside the gauged section, in holder jaws	
Character of broken surface		fine silky

No. 3390.

Sectional area, ".1492×".0743=.011 per square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00050	.00050	.....	.....	
440	40,000	.00130	.00080	.....	.....	
660	60,000	.00210	.00080	.....	.....	
880	80,000	.00310	.00100	.....	.....	
1,100	100,000	.00405	.00095	.....	.....	
1,155	105,000	.00425	.00020	.....	.....	
1,210	110,000	.00457	.00032	.....	.....	
1,265	115,000	.00483	.00026	.....	.....	
1,320	120,000	.00519	.00036	.....	.....	
1,375	125,000	.00548	.00029	.....	.....	
1,430	130,000	.00588	.00040	.....	.....	
1,485	135,000	.00622	.00034	.....	.....	
1,540	140,000	.00667	.00045	.....	.....	
1,595	145,000	.00708	.00041	.....	.....	Elastic limit.
1,650	150,000	.00758	.00050	.....	.....	
1,705	155,000	.00808	.00050	.....	.....	
1,760	160,000	.00877	.00069	.....	.....	
1,815	165,000	.00948	.00071	.....	.....	
1,870	170,000	.01039	.00091	.....	.....	
1,925	175,000	.012	.00161	.....	.....	
1,980	180,000	.014	.002	.....	.....	
2,035	185,000	.016	.002	.....	.....	
2,090	190,000	.021	.005	.....	.....	
2,118	192,540	.023	.002	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	192,540
Elastic limit per square inch of original section	do...	145,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00708
Reduction in area after rupture, per centum of original section		27.3
Position of rupture		1".2 outside the gauged section
Character of broken surface		silky

No. 3391.

Sectional area, ″.1493×″.0743=.011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00060	.00060	.....	.....	
440	40,000	.00136	.00076	.....	.....	
660	60,000	.00212	.00076	.....	.....	
880	80,000	.00298	.00086	.....	.....	
1,100	100,000	.00390	.00092	.....	.....	
1,155	105,000	.00412	.00022	.....	.....	
1,210	110,000	.00441	.00029	.....	.....	
1,265	115,000	.00466	.00025	.....	.....	
1,320	120,000	.00497	.00031	.....	.....	
1,375	125,000	.00519	.00022	.....	.....	
1,430	130,000	.00554	.00035	.....	.....	
1,485	135,000	.00584	.00030	.....	.....	
1,540	140,000	.00618	.00034	.....	.....	
1,595	145,000	.00649	.00031	.....	.....	
1,650	150,000	.00689	.00040	.....	.....	
1,705	155,000	.00731	.00042	.....	.....	
1,760	160,000	.00771	.00040	.....	.....	Elastic limit.
1,815	165,000	.00824	.00053	.....	.....	
1,870	170,000	.00895	.00071	.....	.....	
1,925	175,000	.00960	.00065	.....	.....	
1,980	180,000	.01060	.00100	.....	.....	
2,035	185,000	.012	.0014	.....	.....	
2,090	190,000	.013	.001	.....	.....	
2,145	195,000	.016	.003	.....	.....	
2,168	197,090	.018	.002	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	197,090
Elastic limit per square inch of original section	do ..	160,000
Elongation per inch after rupture	inch..	.003
Elongation per inch under strain at elastic limit	do...	.00771
Reduction in area after rupture, per centum of original section		20.0
Position of rupture	3″.3 outside the gauged section	
Character of broken surface		silky

THIRD LOT.

The coils were marked 1, 2, and 3 when received, for identification.

Marks on coils.

Coil 1, no marks.
Coil 2, stock, S. M.; size, 15×9; strength, 2290; torsion, 10.
Coil 3, stock, S. M.; size, 15×9; strength, 2340; torsion, 15.

Description.

Number of coil.	Surface of wire.	Nominal dimensions.	Actual dimensions.		Weight of coil.		Diameter of curve of wires.	
			One end.	Other end.	Pounds.	Ounces.	In coil.	When released.
		″ ″	″ ″	″ ″			″	″
1	Tinned	.15 × .075	.1491 × .0741	.1492 × .0742	55	.....	17	42
2	...do	.15 × .075	.1488 × .0730	.1486 × .0732	28	8	16	42
3	...do	.15 × .075	.1486 × .0730	.1485 × .0726	17	8	16	48

The surfaces of the wires were smooth, and corners rounded to about ″.01 radius.

In general, the tinning appears of uniform thickness. Each coil, however, showed places in which the coating was broken, exposing the steel in minute places.

There was excess of tin in places on the edges of coil No. 1, the thickness being in these places ″.002±.

The wires coiled successfully over an arbor ″.13 diameter.

Coil No. 1.

No. 3763.

Sectional area, ".1490×".0742=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00070	.00070			
440	40,000	.00142	.00072			
660	60,000	.00220	.00078			
880	80,000	.00299	.00079			
1,100	100,000	.00377	.00078			
1,155	105,000	.00392	.00015			
1,210	110,000	.00411	.00019			
1,265	115,000	.00431	.00020			
1,320	120,000	.00451	.00020			
1,375	125,000	.0047:	.00020			
1,430	130,000	.00491	.00020			
1,485	135,000	.00516	.00025			
1,540	140,000	.00538	.00022			
1,595	145,000	.00558	.00020			
1,650	150,000	.00581	.00023			
1,705	155,000	.00602	.0002:			
1,760	160,000	.00630	.00028			
1,815	165,000	.00659	.00029			
1,870	170,000	.00694	.00035			
1,925	175,000	.00733	.00039			Elastic limit.
1,980	180,000	.00782	.00049			
2,035	185,000	.00860	.00078			
2,090	190,000	.00988	.00128			
2,145	195,000	.017	.00712			
2,200	200,000	.027	.010			
2,209	200,820	.031	.004			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.	200,820
Elastic limit per square inch of original section	do	175,000
Elongation per inch after rupture	inch.	.020
Elongation per inch under strain at elastic limit	do	.00733
Reduction in area after rupture, per centum of original section		32.8
Position of rupture		1".15 inside the gauged section
Character of broken surface		silky

No. 3764.

Sectional area, ".1490×".0735=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00075	.00075	.....	.....	
440	40,000	.00152	.00077	.....	.....	
660	60,000	.00234	.00082	.....	.....	
880	80,000	.00307	.00073	.....	.....	
1,100	100,000	.00387	.00080	.....	.....	
1,155	105,000	.00407	.00020	.....	.....	
1,210	110,000	.00422	.00015	.....	.....	
1,265	115,000	.00447	.00025	.....	.....	
1,320	120,000	.00466	.00019	.....	.....	
1,375	125,000	.00486	.00020	.....	.....	
1,430	130,000	.00510	.00024	.....	.....	
1,485	135,000	.00531	.00021	.....	.....	
1,540	140,000	.00550	.00019	.....	.....	
1,595	145,000	.00579	.00029	.....	.....	
1,650	150,000	.00598	.00019	.....	.....	
1,705	155,000	.00622	.00024	.....	.....	
1,760	160,000	.00650	.00028	.....	.....	
1,815	165,000	.00678	.00028	.....	.....	
1,870	170,000	.00717	.00039	.....	.....	
1,925	175,000	.00755	.00038	.....	.....	Elastic limit.
1,980	180,000	.00806	.00051	.....	.....	
2,035	185,000	.00878	.00072	.....	.....	
2,090	190,000	.01002	.00124	.....	.....	
2,145	195,000	.015	.00498	.....	.....	
2,200	200,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	200,000
Elastic limit per square inch of original section	do...	175,000
Elongation per inch after rupture	inch..	.007
Elongation per inch under strain at elastic limit	do...	.00755
Reduction in area after rupture, per centum of original section		37.3
Position of rupture		7".35 outside the gauged section
Character of broken surface		fine silky

No. 3765.

Sectional area, ".1490×".0740=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00064	.00064			
440	40,000	.00137	.00073			
660	60,000	.00212	.00075			
880	80,000	.00292	.00080			
1,100	100,000	.00365	.00073			
1,320	120,000	.00428	.00063			
1,375	125,000	.00450	.00022			
1,430	130,000	.00488	.00038			
1,485	135,000	.00512	.00024			
1,540	140,000	.00531	.00019			
1,595	145,000	.00553	.00022			
1,650	150,000	.00577	.00024			
1,705	155,000	.00597	.00020			
1,760	160,000	.00623	.00026			
1,815	165,000	.00654	.00031			
1,870	170,000	.00685	.00031			Elastic limit.
1,925	175,000	.00726	.00041			
1,980	180,000	.00774	.00048			
2,035	185,000	.00837	.00063			
2,090	190,000	.00975	.00138			
2,145	195,000	.016	.00625			
2,200	200,000	.020	.004			
2,220	201,820					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	201,820
Elastic limit per square inch of original section	do...	170.000
Elongation per inch after rupture	inch..	.008
Elongation per inch under strain at elastic limit	do...	.0685
Reduction in area after rupture, per centum of original section		37.3
Position of rupture		7".5 outside the gauged section
Character of broken surface		fine silky

Coil No. 2.

No. 3766.

Sectional area, ".1490×".0730=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00074	.00074			
440	40,000	.00149	.00075			
660	60,000	.00227	.00078			
880	80,000	.00307	.00080			
1,100	100,000	.00392	.00083			
1,320	120,000	.00468	.00076			
1,375	125,000	.00484	.00016			
1,430	130,000	.00506	.00022			
1,485	135,000	.00530	.00024			
1,540	140,000	.00549	.00019			
1,595	145,000	.00570	.00021			
1,650	150,000	.00595	.00025			
1,705	155,000	.00617	.00022			
1,760	160,000	.00642	.00025			
1,815	165,000	.00671	.00029			
1,870	170,000	.00708	.00037			Elastic limit.
1,925	175,000	.00750	.00042			
1,980	180,000	.00800	.00050			
2,035	185,000	.00902	.00102			
2,090	190,000	.01080	.00178			
2,145	195,000	.017	.00620			
2,200	200,000	.025	.008			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	200,000
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.011
Elongation per inch under strain at elastic limit	do...	.00708
Reduction in area after rupture, per centum of original section		37.3
Position of rupture	7".9 outside the gauged section	
Character of broken surface		fine silky

No. 3767.

Sectional area, ".1487×".0730=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00076	.00076			
440	40,000	.00153	.00077			
660	60,000	.00230	.00077			
880	80,000	.00311	.00081			
1,100	100,000	.00392	.00081			
1,320	120,000	.00472	.00080			
1,375	125,000	.00487	.00015			
1,430	130,000	.00507	.00020			
1,485	135,000	.00527	.00020			
1,540	140,000	.00554	.00027			
1,595	145,000	.00575	.00021			
1,650	150,000	.00597	.00022			
1,705	155,000	.00624	.00027			
1,760	160,000	.00647	.00023			
1,815	165,000	.00673	.00026			
1,870	170,000	.00707	.00034			
1,925	175,000	.00744	.00037			Elastic limit.
1,980	180,000	.00801	.00057			
2,035	185,000	.00888	.00087			
2,090	190,000	.01057	.00169			
2,145	195,000	.017	.00643			
2,200	200,000					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	200,000
Elastic limit per square inch of original section	do	175,000
Elongation per inch after rupture	inch	.009
Elongation per inch under strain at elastic limit	do	.00744
Reduction in area after rupture, per centum of original section		35.5
Position of rupture		9" outside the gauged section
Character of broken surface		fine silky

No. 3768.

Sectional area, ".1487×".0730=.011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00069	.00069	.....	.....	
440	40,000	.00145	.00076	.....	.....	
660	60,000	.00218	.00073	.....	.....	
880	80,000	.00298	.00080	.....	.....	
1,100	100,000	.00377	.00079	.....	.....	
1,320	120,000	.00458	.00081	.....	.....	
1,375	125,000	.00478	.00020	.....	.....	
1,430	130,000	.00503	.00025	.....	.....	
1,485	135,000	.00522	.00019	.....	.....	
1,540	140,000	.00545	.00023	.....	.....	
1,595	145,000	.00567	.00022	.....	.....	
1,650	150,000	.00590	.00023	.....	.....	
1,705	155,000	.00612	.00022	.....	.....	
1,760	160,000	.00638	.00026	.....	.....	
1,815	165,000	.00668	.00030	.....	.....	
1,870	170,000	.00704	.00036	.....	.....	Elastic limit.
1,925	175,000	.00749	.00045	.....	.....	
1,980	180,000	.00806	.00057	.....	.....	
2,035	185,000	.00906	.00100	.....	.....	
2,090	190,000	.01076	.00170	.....	.....	
2,145	195,000	.015	.00424	.....	.....	
2,200	200,000	.022	.007	.....	.....	
2,212	201,090	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	201,090
Elastic limit per square inch of original section	do ..	170,000
Elongation per inch after rupture	inch .	.012
Elongation per inch under strain at elastic limit	do....	.00704
Reduction in area after rupture, per centum of original section		29.1
Position of rupture		".75 outside the gauged section
Character of broken surface		fine silky

Coil No. 3.

No. 3769.

Sectional area, ".1484" × .0728 = .0108 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
54	5,000	0.	0.	0.	0.	Initial load.
216	20,000	.00061	.00061			
432	40,000	.00141	.00080			
648	60,000	.00208	.00067			
864	80,000	.00284	.00076			
1,080	100,000	.00359	.00075			
1,296	120,000	.00444	.00085			
1,350	125,000	.00464	.00020			
1,404	130,000	.00484	.00020			
1,458	135,000	.00505	.00021			
1,512	140,000	.00530	.00025			
1,566	145,000	.00560	.00030			
1,620	150,000	.00585	.00025			
1,674	155,000	.00624	.00039			Elastic limit.
1,728	160,000	.00685	.00061			
1,782	165,000	.00805	.00120			
1,836	170,000	.01150	.00345			
1,890	175,000	.018	.00650			
1,944	180,000	.023	.005			
1,998	185,000	.030	.007			
2,038	188,700					Tensile strength

General summary.

Tensile strength, per square inch of original section	pounds..	188,700
Elastic limit, per square inch of original section	do...	155,000
Elongation per inch after rupture	inch..	.026
Elongation per inch under strain at elastic limit	do...	.00624
Reduction in area after rupture, per centum of original section		36.1
Position of rupture		2".75 outside the ganged section
Character of broken surface		fine silky

No. 3770.

Sectional area, ″.1484×″.0728=.0108 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
54	5,000	0.	0.	0.	0.	Initial load.
216	20,000	.00072	.00072	.....	.....	
432	40,000	.00149	.00077	.....	.....	
648	60,000	.00227	.00078	.....	.....	
864	80,000	.00302	.00075	.....	.....	
1,080	100,000	.00379	.00077	.....	.....	
1,296	120,000	.00464	.00085	.....	.....	
1,350	125,000	.00483	.00019	.....	.....	
1,414	130,000	.00499	.00016	.....	.....	
1,458	135,000	.00522	.00023	.....	.....	
1,512	140,000	.00543	.00021	.....	.....	
1,566	145,000	.00563	.00020	.....	.....	
1,620	150,000	.00587	.00024	.....	.....	
1,674	155,000	.00612	.00025	.....	.....	
1,728	160,000	.00641	.00029	.....	.....	
1,782	165,000	.00663	.00022	.....	.....	
1,836	170,000	.00693	.00030	.....	.....	Elastic limit.
1,890	175,000	.00752	.00059	.....	.....	
1,944	180,000	.00812	.00060	.....	.....	
1,998	185,000	.00910	.00098	.....	.....	
2,052	190,000	.01100	.00190	.....	.....	
2,106	195,000	.016	.005	.....	.....	
2,160	200,000	.025	.009	.....	.....	
2,186	202,410	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	202,410
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.016
Elongation per inch under strain at elastic limit	do...	.00693
Reduction in area after rupture, per centum of original section		28.7
Position of rupture		″.60 outside the gauged section
Character of broken surface		fine silky

No. 3771.

Sectional area, ″.1484×″.0728=.0108 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
54	5,000	0.	0.	0.	0.	Initial load.
216	20,000	.00074	.00074			
432	40,000	.00137	.00063			
648	60,000	.00212	.00075			
864	80,000	.00293	.00081			
1,080	100,000	.00373	.00080			
1,296	120,000	.00456	.00083			
1,350	125,000	.00474	.00018			
1,404	130,000	.00493	.00019			
1,458	135,000	.00514	.00021			
1,512	140,000	.00534	.00020			
1,566	145,000	.00560	.00026			
1,620	150,000	.00581	.00021			
1,674	155,000	.00603	.00022			
1,728	160,000	.00627	.00024			
1,782	165,000	.00657	.00030			
1,836	170,000	.00691	.00034			Elastic limit.
1,890	175,000	.00739	.00048			
1,944	180,000	.00797	.00058			
1,998	185,000	.00893	.00096			
2,052	190,000	.01052	.00159			
2,106	195,000	.016	.00548			
2,160	200,000	.023	.007			
2,192	202,960					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	202,960
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00691
Reduction in area after rupture, per centum of original section		31.5
Position of rupture		″.80 inside the gauged length
Character of broken surface		fine silky

FOURTH LOT.

Description.

Number of coil.	Surface of wire.	Nominal dimensions.	Actual dimensions.		Weight of coil.		Diameter of curve of wires.	
			Outside end.	Inside end.	Pounds.	Ounces.	In coil.	When released.
		" "	" "	" "				
1	Tinned.	.15×.15	.148×.148	.148×.148	25	.....	21	36
2	...do	.15×.15	.148×.148	.148×.148	27	8	21	41

The wires were trapezoidal in cross section. The maximum diameter of coil No. 1 was ".1494 ± the minimum diameter ".1455±.

For coil No. 2 the maximum and minimum diameters were ".1486 ± and ".1460 ± respectively.

The surfaces of the wires were generally smooth, and the corners rounded to about ".01 radius.

The tinning covered the wires and appeared to be uniformly distributed, except at one end of coil No. 2, where there were naked places, and also places of excessive thickness of tin.

The samples coiled over an arbor the diameter of their diagonals without fracture.

Marks on coils.

No. 1. Strength, 4,705; torsion, 8.
No. 2. Strength, 4,560; torsion, 9.

SAMPLES FROM COIL NO. 1.

No. 3847.

Sectional area, ″.148×″.148=.0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
438	20,000	.00061	.00061	.....	.....	
876	40,000	.00129	.00068	.....	.....	
1,314	60,000	.00202	.00073	.....	.....	
1,752	80,000	.00279	.00077	.....	.....	
2,190	100,000	.00362	.00083	.....	.....	
2,628	120,000	.00448	.00086	.....	.....	
2,737	125,000	.00472	.00024	.....	.....	
2,847	130,000	.00496	.00024	.....	.....	
2,956	135,000	.00518	.00022	.....	.....	
3,066	140,000	.00543	.00025	.....	.....	
3,175	145,000	.00573	.00030	.....	.....	
3,285	150,000	.00598	.00025	.....	.....	
3,394	155,000	.00633	.00035	.....	.....	
3,504	160,000	.00668	.00035	.....	.....	
3,613	165,000	.00707	.00039	.....	.....	Elastic limit.
3,723	170,000	.00757	.00050	.....	.....	
3,832	175,000	.00810	.00053	.....	.....	
3,942	180,000	.00892	.00072	.....	.....	
4,051	185,000	.00982	.00090	.....	.....	
4,161	190,000	.01311	.00329	.....	.....	
4,270	195,000	.016	.00289	.....	.....	
4,380	200,000	.021	.005	.....	.....	
4,489	205,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	205,000
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00707
Reduction in area after rupture, per centum of original section		34.2
Position of rupture		″.60 inside the gauged section
Character of broken surface		fine silky

No. 3848.

Sectional area, ″.148×″.148=.0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
438	20,000	.00068	.00068	.....	.....	
876	40,000	.00133	.00065	.....	.....	
1,314	60,000	.00210	.00077	.....	.....	
1,752	80,000	.00290	.00080	.....	.....	
2,190	100,000	.00372	.00082	.....	.....	
2,628	120,000	.00460	.00082	.....	.....	
2,737	125,000	.00482	.00022	.....	.....	
2,847	130,000	.00507	.00025	.....	.....	
2,956	135,000	.00528	.00021	.....	.....	
3,066	140,000	.00551	.00023	.....	.....	
3,175	145,000	.00575	.00024	.....	.....	
3,285	150,000	.00602	.00027	.....	.....	
3,394	155,000	.00631	.00029	.....	.....	
3,504	160,000	.00668	.00037	.....	.....	
3,613	165,000	.00707	.00039	.....	.....	Elastic limit.
3,723	170,000	.00752	.00045	.....	.....	
3,832	175,000	.00810	.00058	.....	.....	
3,942	180,000	.00888	.00078	.....	.....	
4,051	185,000	.00980	.00092	.....	.....	
4,161	190,000	.01146	.00166	.....	.....	
4,270	195,000	.016	.00454	.....	.....	
4,380	200,000	.018	.002	.....	.....	
4,470	204,110	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	204,110
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00707
Reduction in area after rupture, per centum of original section		34.2
Position of rupture		1.″70 inside the gauged section
Character of broken surface		fine silky

No. 3849.

Sectional area, ″.148×″.148=.0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
438	20,000	.00066	.00066	.....	.....	
876	40,000	.00138	.00072	.....	.....	
1,314	60,000	.00216	.00082	.....	.....	
1,752	80,000	.00290	.00074	.....	.....	
2,190	100,000	.00372	.00082	.....	.....	
2,628	120,000	.00461	.00089	.....	.....	
2,737	125,000	.00478	.00017	.....	.....	
2,847	130,000	.00502	.00024	.....	.....	
2,956	135,000	.00523	.00021	.....	.....	
3,066	140,000	.00548	.00025	.....	.....	
3,175	145,000	.00570	.00022	.....	.....	
3,285	150,000	.00594	.00024	.....	.....	
3,394	155,000	.00618	.00024	.....	.....	
3,504	160,000	.00651	.00033	.....	.....	
3,613	165,000	.00682	.00031	.....	.....	
3,723	170,000	.00719	.00037	.....	.....	Elastic limit.
3,832	175,000	.00767	.00048	.....	.....	
3,942	180,000	.00820	.00053	.....	.....	
4,051	185,000	.00897	.00077	.....	.....	
4,161	190,000	.00997	.00100	.....	.....	
4,270	195,000	.01130	.00133	.....	.....	
4,380	200,000	.014	.00270	.....	.....	
4,489	205,000	.017	.003	.....	.....	
4,566	208,490	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	208,490
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00719
Reduction in area after rupture, per centum of original section		39.7
Position of rupture		5″.22 outside the gauged section
Character of broken surface		fine silky

SAMPLES FROM COIL NO. 2.

No. 3850.

Sectional area, ".148×".148=.0219 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
438	20,000	.00060	.00060	.....	.....	
876	40,000	.00128	.00068	.....	.....	
1,314	60,000	.00205	.00077	.....	.....	
1,752	80,000	.00277	.00072	.....	.....	
2,190	100,000	.00362	.00085	.....	.....	
2,628	120,000	.00445	.00083	.....	.....	
2,737	125,000	.00464	.00019	.....	.....	
2,847	130,000	.00485	.00021	.....	.....	
2,956	135,000	.00509	.00024	.....	.....	
3,066	140,000	.00530	.00021	.....	.....	
3,175	145,000	.00554	.00024	.....	.....	
3,285	150,000	.00576	.00022	.....	.....	
3,394	155,000	.00600	.00024	.....	.....	
3,504	160,000	.00630	.00030	.....	.....	
3,613	165,000	.00660	.00030	.....	.....	
3,723	170,000	.00695	.00035	.....	.....	Elastic limit.
3,832	175,000	.00735	.00040	.....	.....	
3,942	180,000	.00779	.00044	.....	.....	
4,051	185,000	.00844	.00065	.....	.....	
4,161	190,000	.00905	.00061	.....	.....	
4,270	195,000	.01005	.00100	.....	.....	
4,380	200,000	.01165	.00160	.....	.....	
4,489	205,000	.017	.00535	.....	.....	
4,599	210,000	.023	.006	.....	.....	
4,662	212,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	212,880
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.027
Elongation per inch under strain at elastic limit	do...	.00695
Reduction in area after rupture, per centum of original section		39.7
Position of rupture		".75 inside the gauged section
Character of broken surface		fine silky

No. 3851.

Sectional area, ″.148×″.148=.0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
438	20,000	.00058	.00058	.....	.....	
876	40,000	.00128	.00070	.....	.....	
1,314	60,000	.00205	.00077	.....	.....	
1,752	80,000	.00282	.00077	.....	.....	
2,190	100,000	.00360	.00078	.....	.....	
2,628	120,000	.00445	.00085	.....	.....	
2,737	125,000	.00465	.00020	.....	.....	
2,847	130,000	.00486	.00021	.....	.....	
2,956	135,000	.00510	.00024	.....	.....	
3,066	140,000	.00530	.00020	.....	.....	
3,175	145,000	.00555	.00025	.....	.....	
3,285	150,000	.00578	.00023	.....	.....	
3,394	155,000	.00604	.00026	.....	.....	
3,504	160,000	.00630	.00026	.....	.....	
3,613	165,000	.00664	.00034	.....	.....	
3,723	170,000	.00700	.00036	.....	.....	
3,832	175,000	.00737	.00037	.....	.....	Elastic limit.
3,942	180,000	.00786	.00049	.....	.....	
4,051	185,000	.00842	.00056	.....	.....	
4,161	190,000	.00914	.00072	.....	.....	
4,270	195,000	.01003	.00089	.....	.....	
4,380	200,000	.01158	.00155	.....	.....	
4,489	205,000	.015	.00342	.....	.....	
4,599	210,000	.018	.003	.....	.....	
4,640	211,870	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	211,870
Elastic limit per square inch of original section	do...	175,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00737
Reduction in area after rupture, per centum of original section		34.2
Position of rupture		½″ outside the gauged section
Character of broken surface		fine silky

No. 3852.

Sectional area, ″.148×″.148=.0219 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
109	5,000	0.	0.	0.	0.	Initial load.
438	20,000	.00059	.00059	.....	.....	
876	40,000	.00138	.00079	.....	.....	
1,314	60,000	.00212	.00074	.....	.....	
1,752	80,000	.00295	.00083	.....	.....	
2,190	100,000	.00374	.00079	.....	.....	
2,628	120,000	.00458	.00084	.....	.....	
2,737	125,000	.00479	.00021	.....	.....	
2,847	130,000	.00500	.00021	.....	.....	
2,956	135,000	.00521	.00021	.....	.....	
3,066	140,000	.00544	.00023	.....	.....	
3,175	145,000	.00564	.00020	.....	.....	
3,285	150,000	.00590	.00026	.....	.....	
3,394	155,000	.00617	.00027	.....	.....	
3,504	160,000	.00642	.00025	.....	.....	
3,613	165,000	.00672	.00030	.....	.....	
3,723	170,000	.00707	.00035	.....	.....	Elastic limit.
3,832	175,000	.00748	.00041	.....	.....	
3,942	180,000	.00800	.00052	.....	.....	
4,051	185,000	.00838	.00038	.....	.....	
4,161	190,000	.00912	.00074	.....	.....	
4,270	195,000	.00997	.00085	.....	.....	
4,380	200,000	.01137	.00140	.....	.....	
4,489	205,000	.016	.00463	.....	.....	
4,599	210,000	.019	.003	.....	.....	
4,640	211,870	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	211,870
Elastic limit per square inch of original section	do...	170,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00707
Reduction in area after rupture, per centum of original section		37.4
Position of rupture		1″.70 inside the gauged section
Character of broken surface		fine silky

TABULATION OF SQUARE AND FLAT TINNED AND UNTINNED STEEL WIRE.

[From R. H. Wolff & Co., Limited.]

FIRST LOT.

No. of test.	Mark on coil.	Dimensions. Width.	Dimensions. Thickness.	Sectional area.	Elastic limit. Total.	Elastic limit. Per square inch.	Ultimate strength. Total.	Ultimate strength. Per square inch.	Elongation in 10 inches.		Area at fracture.	Construction of area.	Appearance of fracture.	Remarks.
		Inch.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*P. ct.*	*" " Sq. in.*	*P. ct.*		
3146	1	.0994	.0994	.0098	1,568	160,000	2,148	219,180	.09	0.9	.080×.080=.0064	34.7	Fine silky	Not tinned.
3147	1	.0994	.0994	.0098	1,617	165,000	2,176	222,040	.14	1.4	.080×.080=.0064	34.7	....do	
3148	1	.0994	.0994	.0098	1,715	175,000	2,167	221,120	.08	0.8	.075×.075=.0056	42.9	....do	
3149	2	.0991	.0991	.0098	1,617	165,000	2,142	218,570	.13	1.3	.083×.083=.0069	29.6	....do	
3150	2	.0988	.0988	.0097	1,600	165,000	2,112	217,730	.17	1.7	.083×.083=.0069	28.9	....do	
3151	2	.0989	.0987	.0097	1,600	165,000	2,128	219,380	.11	1.1	.085×.085=.0072	25.8	....do	
3152	3	.1490	.0744	.011	2,035	185,000	2,512	228,360	.14	1.4	.130×.060=.0078	29.1	....do	
3153	3	.1490	.0744	.011	2,035	185,000	2,530	230,000	.06	0.6	.133×.056=.0074	32.7	....do	
3154	3	.1490	.0744	.011	2,035	185,000	2,508	228,000	.17	1.7	.133×.060=.0080	27.3	....do	
3155	4	.1483	.0740	.011	1,980	180,000	2,445	222,270	.07	0.7	.130×.060=.0078	29.1	....do	
3156	4	.1483	.0740	.011	1,870	170,000	2,412	219,270	.07	0.7	.130×.062=.0081	26.4	... do	
3157	4	.1483	.0740	.011	1,870	170,000	2,420	220,000	.09	0.9	.130×.055=.0072	34.5	....do	

SECOND LOT.

No. of test.	Mark on coil.	Dimensions. Width.	Dimensions. Thickness.	Sectional area.	Elastic limit. Total.	Elastic limit. Per square inch.	Ultimate strength. Total.	Ultimate strength. Per square inch.	Elongation in 10 inches.		Area at fracture.	Construction of area.	Appearance of fracture.	Remarks.
		Inch.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*P. ct.*	*" " Sq. in.*	*P. ct.*		
3386	1	.1474	.1474	.0217	2,929	135,000	4,006	184,610	.22	2.2	.123×.123=.0151	30.4	Silky	Not tinned.
3387	1	.1472	.1472	.0217	3,038	140,000	4,048	186,540	.18	1.8	.121×.121=.0146	32.8	... do	
3388	1	.1472	.1474	.0217	2,604	120,000	3,997	184,190	.30	3.0	.122×.122=.0149	31.3	....do	
3389	2	.1492	.0741	.011	1,760	160,000	2,178	198,000	.10	1.0	.140×.063=.0088	20.0	Fine silky	
3390	2	.1491	.0743	.011	1,595	145,000	2,118	192,540	.11	1.1	.134×.060=.0080	27.3	Silky	
3391	2	.1493	.0743	.011	1,760	160,000	2,168	197,090	.03	0.3	.135×.065=.0088	20.0	....do	

THIRD LOT.

No. of test.	Mark on coil.	Dimensions. Width.	Dimensions. Thickness.	Sectional area.	Elastic limit. Total.	Elastic limit. Per square inch.	Ultimate strength. Total.	Ultimate strength. Per square inch.	Elongation in 10 inches.		Area at fracture.	Construction of area.	Appearance of fracture.	Remarks.
		Inch.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*P. ct.*	*" " Sq. in.*	*P. ct.*		
3763	1	.1490	.0742	.011	1,925	175,000	2,209	200,820	.20	2.0	.130×.057=.0074	32.8	Silky	Tinned coil.
3764	1	.1490	.0735	.011	1,925	175,000	2,200	200,000	.07	0.7	.125×.055=.0069	37.3	Fine silky	
3765	1	.1490	.0740	.011	1,870	170,000	2,220	201,820	.08	0.8	.125×.055=.0069	37.3	....do	
3766	2	.1490	.0730	.011	1,870	170,000	2,200	200,000	.11	1.1	.125×.055=.0069	37.3	....do	
3767	2	.1487	.0730	.011	1,925	175,000	2,200	200,000	.09	0.9	.130×.055=.0071	35.5	....do	
3768	2	.1487	.0730	.011	1,870	170,000	2,212	201,090	.12	1.2	.135×.058=.0078	29.1	....do	
3769	3	.1481	.0728	.0108	1,674	155,000	2,038	188,700	.26	2.6	.130×.053=.0069	36.1	... do	
3770	3	.1484	.0728	.0108	1,836	170,000	2,186	202,410	.18	1.8	.133×.058=.0077	28.7	....do	
3771	3	.1484	.0728	.0108	1,836	170,000	2,192	202,960	.20	2.0	.128×.058=.0074	31.5	... do	

TABULATION OF SQUARE AND FLAT TINNED AND UNTINNED STEEL WIRE—Continued.

FOURTH LOT.

No. of test.	Mark on coil.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Remarks.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
		Inch.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*P. ct.*	" " *Sq. in.*	*P. ct.*		
3847	1	.148	.148	.0219	3,613	165,000	4,489	205,000	.22	2.2	.120×.120=.0144	34.2	Fine silky	Tinned coil.
3848	1	.148	.148	.0219	3,613	165,000	4,470	204,110	.22	2.2	.120×.120=.0144	34.2	....do	
3849	1	.148	.148	.0219	3,723	170,000	4,566	208,490	.12	1.2	.115×.115=.0132	39.7	....do	
3850	2	.148	.148	.0219	3,723	170,000	4,602	212,880	.27	2.7	.115×.115=.0132	39.7	....do	
3851	2	.148	.148	.0219	3,832	175,000	4,640	211,870	.12	1.2	.120×.120=.0144	34.2	....do	
3852	2	.148	.148	.0219	3,723	170,000	4,640	211,870	.20	2.0	.117×.117=.0137	37.4	....do	

FIFTH LOT.

Samples marked "Stock 71" and additional marks given in table.
Length of specimens, 16″ to 18″.

No of test.	Additional marks.	Surface of wire.	Dimensions.		Sectional area.	Tensile strength.		Area at fracture.	Contraction of area.	Appearance of fracture.
						Total.	Per square inch.			
			Inch.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Square inch.*	*Per cent.*	
4276	No. 2 strength 3755	Tinned	.1484	.1486	.0220	3,780	171,820	.125×.125=.0156	29.1	Fine silky.
4277	No. 3 strength 3545	....do	.1504	.1503	.0226	3,494	154,600	.120×.120=.0144	36.3	Do.
4278	No. 4 strength 3420	....do	.1489	.1503	.0224	3,552	158,570	.118×.118=.0139	37.9	Do.
4279	No. 5 strength 3500	....do	.1506	.1503	.0226	3,588	158,760	.115×.115=.0132	41.6	Do.
4280	No. 6 strength 3500	....do	.1490	.1494	.0223	3,432	153,900	.115×.115=.0132	40.8	Do.
4281	No. 7 strength 3465	....do	.1489	.1486	.0221	3,370	152,490	.114×.114=.0130	41.2	Do.
4282	No. 8 strength 3465	....do	.1507	.1504	.0227	3,602	158,680	.113×.113=.0128	43.6	Do.
4283	No. 9 strength 3325	....do	.1484	.1487	.0221	3,374	152,670	.111×.111=.0123	44.3	Do.
4284	No. 10 strength 3435	....do	.1499	.1494	.0224	3,419	152,630	.111×.111=.0123	45.1	Do.
4285	No. 11 strength 3320	....do	.1484	.1476	.0219	3,346	152,790	.115×.115=.0132	39.7	Do.
4286	Not marked	Not tinned	.252	Diam.	.0499	4,428	88,740	.165 diam.=.0214	57.1	Do.
4287	....do	....do	.252	Do.	.0499	4,387	87,920	.170 diam.=.0227	54.5	Do.
4288	....do	....do	.250	Do.	.0491	4,353	88,660	.170 diam.=.0227	53.8	Do.
4289	....do	....do	.248	Do.	.0483	4,368	90,430	.168 diam.=.0222	54.0	Do.

ELECTRICALLY WELDED STEEL WIRE.

SAMPLES TAKEN FROM COILS OF FIRST LOT.

No. of test.	Coil number.	Welding burr.	Size at weld.	Dimensions of wire.		Sectional area of wire.	Tensile strength.	
				Width.	Thickness.		Total.	Per square inch.
			Inch.	*Inch.*	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*
3180	1	Removed	.....	.0994	.0994	.0098	1,368	139,590
3181	1	....do	.....	.0994	.0994	.0098	953	97,240
3182	1	Not removed..	.170 ×.175	.0994	.0994	.0098	1,496	152,650
3183	2	Removed	.1002×.0994	.0991	.0991	.0098	1,482	151,220
3184	2	....do	.1021×.1002	.0991	.0991	.0098	1,151	117,450
3185	2	Not removed..	.1700×.1750	.0991	.0991	.0098	1,648	168,160
3186	3	Removed	.075 ×.149	.1490	.0744	.0110	983	89,360
3187	3	....do	.074 ×.151	.1490	.0774	.0110	1,512	137,450
3188	3	Not removed..	.130 ×.205	.1490	.0744	.0110	1,448	131,640
3189	4	Removed	.074 ×.148	.1483	.0740	.0110	1,294	117,640
3190	4	....do	.074 ×.148	.1483	.0740	.0110	1,108	100,730
3191	4	Not removed..	.150 ×.220	.1483	.0740	.0110	1,766	160,550

Specimens fractured at the welds, excepting Nos. 3185 and 3191, which fractured ".10 from the joints, and exhibited silky fractures.

Those which fractured at the welds exhibited surfaces generally smooth, with indistinct granular appearance, the granulation being more pronounced in the stronger welds. No. 3187 was in part silky.

ELECTRICALLY WELDED STEEL WIRE.

SAMPLES TAKEN FROM COILS OF SECOND LOT.

No. of test.	No. of coil.	Welding burr.	Size at weld.	Dimensions of wire.		Sectional area of wire.	Tensile strength.		Fracture.
				Width.	Thickness.		Total.	Per square inch.	
			Inch.	*Inch.*	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
3568	1	Not removed..	.250 × .250	.1975	.1474	.0217	3,195	147,240	".3 from middle of welding burr. Fine granular, silky center.
3569	1	Removed	.1477×.1484	.1474	.1476	.0217	2,790	128,570	At the weld. Granular, dull silky at corners.
3570	1	....do	.1481×.1493	.1477	.1476	.0218	2,785	127,750	At the weld. Granular, dull spot at one corner.
3571	1	....do	.1485×.1485	.1478	.1475	.0218	3,238	148,530	At the weld. Granular.
3572	1	....do	.1476×.1476	.1476	.1476	.0218	2,680	122,910	At the weld. Granular, varying in size.
3573	2	Not removed..	.220 × .150	.1494	.0750	.011	1,430	133,000	".18 from middle of welding burr. Fine silky.
3574	2	Removed	.1493×.0746	.1495	.0750	.011	1,392	126,550	At the weld. Granular.
3575	2	....do	.1491×.0756	.1496	.0751	.011	1,338	121,640	At the weld. Granular, dull silky at one edge.
3576	2	....do	.1500×.0751	.1494	.0751	.011	1,462	132,910	".25 from the weld. Fine silky.
3577	2	.. .do	.1502×.0753	.1492	.0743	.011	1,410	128,180	At the weld. Granular, dull silky at one edge.

SQUARE AND FLAT TINNED STEEL WIRE FROM TRENTON IRON COMPANY.

Coil A. Weight, 24½ pounds.

FLAT WIRE.

No. 3292.

From outside end of coil.
Sectional area, ″.1523 × ″.0742=.011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00059	.00057	.....	.....	
440	40,000	.00135	.00078	.....	.....	
660	60,000	.00214	.00079	.....	.....	
880	80,000	.00304	.00090	.....	.....	
1,100	100,000	.00407	.00103	.....	.....	
1,155	105,000	.00437	.00030	.....	.....	
1,210	110,000	.00473	.00036	.....	.....	
1,265	115,000	.00509	00036	.....	.....	
1,320	120,000	.00551	.00042	.....	.....	
1,375	125,000	.00598	.00047	.....	.....	
1,430	130,000	.00652	.00054	.....	.....	
1,485	135,000	.00716	.00064	.....	.....	
1,540	140,000	.00795	.00079	.....	.....	
1,595	145,000	.00909	.00114	.....	.....	
1,650	150,000	.01166	.00257	.....	.....	
1,698	154,360	.021	.00934	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.	154,360
Elongation per inch after rupture	inch.	.016
Reduction in area after rupture, per centum of original section		26.4
Position of rupture		″.83 inside the gauged section
Character of broken surface		fine silky, lamellar

No. 3293.

From outside end of coil.
Sectional area ".1523 × ".0742 = .011 square inch.
Gauged length 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00056	.00056			
440	40,000	.00132	.00076			
550	50,000	.00167	.00035			
605	55,000	.00187	.00020			
660	60,000	.00203	.00016			
715	65,000	.00227	.00024			
770	70,000	.00247	.00020			
825	75,000	.00273	.00026			
880	80,000	.00293	.00020			
935	85,000	.00318	.00025			
990	90,000	.00341	.00023			
1,045	95,000	.00364	.00023			
1,100	100,000	.00392	.00028			
1,156	105,000	.00416	.00024			
1,210	110,000	.00449	.00033			
1,265	115,000	.00485	.00036			
1,320	120,000	.00522	.00037			
1,375	125,000	.00562	.00040			Elastic limit.
1,430	130,000	.00612	.00050			
1,485	135,000	.00672	.00060			
1,540	140,000	.00739	.00067			
1,593	145,000	.00813	.00104			
1,650	150,000	.01000	.00157			
1,705	155,000	.020	.010			
1,712	155,640	.022	.002			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	155,640
Elastic limit per square inch of original section	do	125,000
Elongation per inch after rupture	inch	.017
Elongation per inch under strain at elastic limit	do	.00562
Reduction in area after rupture per centum of original section		23.6
Position of rupture		".2 inside the gauged section
Character of broken surface		silky; serrated

No. 3294.

From outside end of coil.
Sectional area, ″.1523×″.0742=.011 square inch.
Gauged length 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	.....	.....	Initial load.
220	20,000	.00063	.00063	.....	.....	
440	40,000	.00128	.00075	.....	.....	
555	50,000	.00176	.00038	.....	.....	
605	55,000	.00194	.00018	.....	.....	
660	60,000	.00215	.00021	.....	.....	
715	65,000	.00236	.00021	.....	.....	
770	70,000	.00255	.00019	.....	.....	
825	75,000	.00278	.00023	.....	.....	
880	80,000	.00300	.00022	.....	.....	
935	85,000	.00322	.00022	.....	.....	
990	90,000	.00345	.00023	.....	.....	
1,045	95,000	.00370	.00025	.....	.....	
1,100	100,000	.00395	.00025	.....	.....	
1,155	105,000	.00425	.00030	.....	.....	
1,210	110,000	.00458	.00033	.....	.....	
1,255	115,000	.00492	.00034	.....	.....	
1,320	120,000	.00530	.00038	.....	.....	Elastic limit.
1,375	125,000	.00578	.00048	.....	.....	
1,430	130,000	.00622	.00044	.....	.....	
1,485	135,000	.00680	.00058	.....	.....	
1,540	140,000	.00752	.00072	.....	.....	
1,595	145,000	.00858	.00106	.....	.....	
1,650	150,000	.01072	.00214	.....	.....	
1,705	155,000	.014	.00228	.....	.....	
1,714	155,820	.017	.003	.....	.....	Tensile strength.

Tensile strength per square inch of original section	pounds..	155,820
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.006
Elongation per inch under strain at elastic limit	do...	.00530
Reduction in area after rupture, per centum of original section		26.4
Position of rupture	7″.8 outside the gauged section	
Character of broken surface	silky, lamellar	

No. 3295.

From inside end of coil.
Sectional area, ″.1510×″.0738=.011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00063	.00063			
440	40,000	.00135	.00072			
550	50,000	.00173	.00038			
605	55,000	.00193	.00020			
660	60,000	.00214	.00021			
715	65,000	.00234	.00020			
770	70,000	.00256	.00022			
825	75,000	.00283	.00027			
880	80,000	.00308	.00025			
935	85,000	.00337	.00029			
990	90,000	.00364	.00027			
1,045	95,000	.00394	.00030			
1,100	100,000	.00428	.00034			
1,155	105,000	.00468	.00040			Elastic limit.
1,210	110,000	.00513	.00045			
1,265	115,000	.00562	.00049			
1,320	120,000	.00617	.00055			
1,375	125,000	.00687	.00070			
1,430	130,000	.00780	.00093			
1,485	135,000	.00925	.00145			
1,540	140,000	.01150	.00225			
1,584	144,000	.021	.00950			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	144,000
Elastic limit per square inch of original section	do...	105,000
Elongation per inch after rupture	inch..	.014
Elongation per inch under strain at elastic limit	do...	.00468
Reduction in area after rupture, per centum of original section		34.5
Position of rupture		2″.9 outside the gauged section
Character of broken surface		fine silky

Coil AA Weight 27¾ pounds.

".15 SQUARE WIRE.

No. 3296.

From outside end of coil.
Sectional area ".1510×".1500=.0226 square inch.
Gauged length 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
113	5,000	0.	0.	0.	0.	Initial load.
452	20,000	.00057	.00057	.....	.....	
904	40,000	.00135	.00078	.....	.....	
1,130	50,000	.00178	.00043	.....	.....	
1,243	55,000	.00201	.00023	.....	.....	
1,356	60,000	.00223	.00022	.....	.....	
1,469	65,000	.00246	.00023	.....	.....	
1,582	70,000	.00270	.00024	.....	.....	
1,695	75,000	.00296	.00026	.....	.....	
1,808	80,000	.00328	.00032	.....	.....	
1,921	85,000	.00354	.00026	.....	.....	
2,034	90,000	.00387	.00033	.....	.....	
2,147	95,000	.00422	.00035	.....	.....	Elastic limit.
2,260	100,000	.00464	.00042	.....	.....	
2,373	105,000	.00509	.00045	.....	.....	
2,486	110,000	.00568	.00059	.....	.....	
2,599	115,000	.00633	.00065	.....	.....	
2,712	120,000	.00725	.00092	.....	.....	
2,825	125,000	.00891	.00166	.....	.....	
2,910	128,760	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	128,760
Elastic limit per square inch of original section	do...	95,000
Elongation per inch after rupture	inch..	.006
Elongation per inch under strain at elastic limit	do...	.00422
Reduction in area after rupture, per centum of original section		41.6
Position of rupture		7".3 outside the gauged section
Character of broken surface		fine silky

No. 3297.

From outside end of coil.
Sectional area, ″.1510×″.1500=.0226 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
113	5,000	0.	0.	0.	0.	Initial load.
452	20,000	.00059	.00059	.....	.....	
904	40,000	.00137	.00078	.....	.....	
1,130	50,000	.00177	.00040	.....	.....	
1,243	55,000	.00200	.00023	.....	.....	
1,356	60,000	.00223	.00023	.....	.....	
1,469	65,000	.00246	.00023	.....	.....	
1,582	70,000	.00270	.00024	.....	.....	
1,695	75,000	.00295	.00025	.....	.....	
1,808	80,000	.00322	.00027	.....	.....	
1,921	85,000	.00352	.00030	.....	.....	
2,034	90,000	.00380	.00028	.....	.....	
2,147	95,000	.00418	.00038	.....	.....	Elastic limit.
2,260	100,000	.00455	.00037	.....	.....	
2,373	105,000	.00504	.00049	.....	.....	
2,486	110,000	.00558	.00054	.....	.....	
2,599	115,000	.00620	.00062	.....	.....	
2,712	120,000	.00711	.00091	.....	.....	
2,825	125,000	.00837	.00126	.....	.....	
2,938	130,000	.010	.00163	.....	.....	
3,026	133,890	.014	.004	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	133,890
Elastic limit per square inch of original section	do...	95,000
Elongation per inch after rupture	inch..	.009
Elongation per inch under strain at elastic limit	do...	.00455
Reduction in area after rupture, per centum of original section		41.6
Position of rupture		4″.6 outside the gauged section
Character of broken surface		fine silky

No. 3298.

From outside end of coil.
Sectional area, ″.1510×″.1500=.0226 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
113	5,000	0.	0.	0.	0.	Initial load.
452	20,000	.00063	.00063	.....	.....	
904	40,000	.00142	.00079	.....	.....	
1,130	50,000	.00187	.00045	.....	.....	
1,243	55,000	.00206	.00019	.....	.....	
1,356	60,000	.00229	.00023	.....	.....	
1,469	65,000	.00251	.00022	.....	.....	
1,582	70,000	.00275	.00024	.....	.....	
1,695	75,000	.00301	.00026	.....	.....	
1,808	80,000	.00327	.00026	.....	.....	
1,921	85,000	.00358	.00031	.....	.....	
2,034	90,000	.00387	.00029	.....	.....	
2,147	95,000	.00422	.00035	.....	.....	Elastic limit.
2,260	100,000	.00464	.00042	.....	.....	
2,373	105,000	.00511	.00047	.....	.....	
2,486	110,000	.00568	.00057	.....	.....	
2,599	115,000	.00655	.00087	.....	.....	
2,712	120,000	.00785	.00130	.....	.....	
2,825	125,000	.01060	.00275	.....	.....	
2,904	128,500	.017	.0064	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	128,500
Elastic limit per square inch of original section	do...	95,000
Elongation per inch after rupture	inch..	.010
Elongation per inch under strain at elastic limit	do...	.00422
Reduction in area after rupture, per centum of original section		44.7
Position of rupture		8″.75 outside the gauged section
Character of broken surface		fine silky

Coil AAA. Weight 27¼ pounds.

".10 SQUARE WIRE.

No. 3309.

From outside end of coil.
Sectional area, ".1011×".1002=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00065	.00065			
400	40,000	.00142	.00077			
500	50,000	.00184	.00042			
550	55,000	.00204	.00020			
600	60,000	.00226	.00022			
650	65,000	.00248	.00022			
700	70,000	.00271	.00023			
750	75,000	.00298	.00027			
800	80,000	.00320	.00022			
850	85,000	.00347	.00027			
900	90,000	.00372	.00025			
950	95,000	.00403	.00031			
1,000	100,000	.00434	.00031			
1,050	105,000	.00468	.00034			Elastic limit.
1,100	110,000	.00510	.00042			
1,150	115,000	.00550	.00040			
1,200	120,000	.00602	.00052			
1,250	125,000	.00681	.00079			
1,300	130,000	.00763	.00082			
1,350	135,000	.009	.00137			
1,400	140,000	.012	.003			
1,446	144,600	.023	.011			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	144,600
Elastic limit per square inch of original section	do	105,000
Elongation per inch after rupture	inch	.013
Elongation per inch under strain at elastic limit	do	.00468
Reduction in area after rupture, per centum of original section		39.0
Position of rupture	1".4 outside the gauged section	
Character of broken surface		fine silky

No. 3310.

From outside end of coil.
Sectional area ".1011×".1002=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00057	.00057	.....	.....	
400	40,000	.00134	.00077	.....	.....	
500	50,000	.00172	.00038	.....	.....	
550	55,000	.00192	.00020	.....	.....	
600	60,000	.00212	.00020	.....	.....	
650	65,000	.00233	.00021	.....	.....	
700	70,000	.00258	.00025	.....	.....	
750	75,000	.00283	.00025	.....	.....	
800	80,000	.00308	.00025	.....	.....	
850	85,000	.00333	.00025	.....	.....	
900	90,000	.00362	.00029	.....	.....	
950	95,000	.00391	.00029	.....	.....	
1,000	100,000	.00417	.00026	.....	.....	
1,050	105,000	.00455	.00038	.....	.....	Elastic limit.
1,100	110,000	.00498	.00043	.....	.....	
1,150	115,000	.00540	.00042	.....	.....	
1,200	120,000	.00600	.00060	.....	.....	
1,250	125,000	.00669	.00069	.....	.....	
1,300	130,000	.00760	.00091	.....	.....	
1,350	135,000	.00902	.00142	.....	.....	
1,400	140,000	.012	.00298	.....	.....	
1,445	144,500	.023	.011	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	144,500
Elastic limit per square inch of original section	do...	115,000
Elongation per inch after rupture	inch..	.013
Elongation per inch under strain at elastic limit	do...	.00455
Reduction in area after rupture, per centum of original section		32.0
Position of rupture		11".75 outside the gauged section
Character of broken surface		fine silky

No. 3311.

From outside end of coil.
Sectional area, ″.1011×″.1002=.010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	.....	.....	Initial load.
200	20,000	.00067	.00067	.....	.....	
400	40,000	.00154	.00087	.....	.....	
500	50,000	.00193	.00039	.....	.....	
550	55,000	.00213	.00020	.....	.....	
600	60,000	.00233	.00020	.....	.....	
650	65,000	.00255	.00022	.....	.....	
700	70,000	.00283	.00028	.....	.....	
750	75,000	.00305	.00022	.....	.....	
800	80,000	.00330	.00025	.....	.....	
850	85,000	.00357	.00027	.....	.....	
900	90,000	.00387	.00030	.....	.....	
950	95,000	.00418	.00026	.....	.....	
1,000	100,000	.00445	.00032	.....	.....	
1,050	105,000	.00481	.00036	.....	.....	
1,100	110,000	.00520	.00039	.....	.....	Elastic limit.
1,150	115,000	.00562	.00042	.....	.....	
1,200	120,000	.00618	.00056	.....	.....	
1,250	125,000	.00700	.00082	.....	.....	
1,300	130,000	.00785	.00085	.....	.....	
1,350	135,000	.00917	.00132	.....	.....	
1,400	140,000	.018	.00383	.....	.....	
1,442	144,200	.025	.012	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	144,200
Elastic limit per square inch of original section	do...	110,000
Elongation per inch after rupture	inch..	.020
Elongation per inch under strain at elastic limit	do...	.00520
Reduction in area after rupture, per centum of original section		36.0
Position of rupture		3″.45 inside the gauged length
Character of broken surface		fine silky

TABULATION OF SQUARE AND FLAT STEEL WIRE FROM TRENTON IRON COMPANY.

No. of test.	Mark on coil.	Dimensions in inches.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.					
				Sq. inch.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*	*" " Sq. in.*	*Per cent.*	
3292	A	.1523	.0742	.011	.....	.....	1,698	154,300	.16	1.6	.135×.060=.0081	26.4	Fine silky, lamellar.
3293	A	.1523	.0742	.011	1,375	125,000	1,712	155,640	.17	1.7	.140×.060=.0084	23.6	Silky, serrated.
3294	A	.1523	.0742	.011	1,320	120,000	1,714	155,820	.06	0.6	.135×.060=.0081	26.4	Silky, lamellar.
3295	A	.1510	.0738	.011	1,155	105,000	1,584	144,000	.14	1.4	.130×.055=.0072	34.5	Fine silky.
3296	AA	.1510	.1500	.0226	2,147	95,000	2,910	128,760	.06	0.6	.115×.115=.0132	41.6	Do.
3297	AA	.1510	.1500	.0226	2,260	100,000	3,026	133,890	.09	0.9	.115×.115=.0132	41.6	Do.
3298	AA	.1510	.1500	.0226	2,147	95,000	2,904	128,500	.10	1.0	.112×.112=.0125	44.7	Do.
3309	AAA	.1011	.1002	.010	1,050	105,000	1,446	144,600	.13	1.3	.078×.078=.0061	39.0	Do.
3310	AAA	.1011	.1002	.010	1,050	105,000	1,445	144,500	.18	1.8	.078×.078=.0061	39.0	Do.
3311	AAA	.1011	.1002	.010	1,100	110,000	1,442	144,200	.20	2.0	.080×.080=.0064	36.0	Do.

ELECTRICALLY WELDED STEEL WIRE FROM TRENTON IRON COMPANY.

No. of test.	Coil.	Welding burr.	Size at weld.	Dimensions of wire.		Sectional area of wire.	Tensile strength.		Fracture.
				Width.	Thickness.		Total.	Per square inch.	
			" "	*Inch.*	*Inch.*	*Sq. Inch.*	*Pounds.*	*Pounds.*	
3356	A	Removed	.147 ×.075	.1510	.0735	.0110	1,474	134,000	About ".06 from weld, took oblique direction across wire. Silky.
3357	A	....do	.150 ×.075	.1510	.0735	.0110	1,532	139,270	At weld. Dull luster.
3358	A	Not removed	.200 ×.140	.1510	.0735	.0110	1,571	142,820	".70 from weld. Silky.
3359	AA	Removed	.146 ×.145	.1510	.1500	.0226	2,448	108,320	At weld. Dull luster in part, granular in part.
3360	AA	....do	.149 ×.146	.1510	.1500	.0226	2,645	117,040	About ".12 from the weld. Silky.
3361	AA	Not removed.....	.220 ×.220	.1510	.1500	.0226	2,602	115,130	".10 from the weld. Silky.
3362	AAA	Removed	.1014×.0969	.1010	.1012	.0102	1,353	132,650	At weld. Dull luster. A small piece detached at place of rupture.
3363	AAA	....do	.1006×.0996	.1006	.1011	.0102	1,458	142,940	At weld. Dull luster.
3364	AAA	Not removed.....	.180 ×.180	.1006	.1014	.0102	1,547	151,670	".10 from weld. Silky.

FLAT AND SQUARE TINNED AND UNTINNED STEEL WIRE FROM THE WASHBURN & MOEN MANUFACTURING COMPANY.

Marks.	Surface of wire.	Nominal dimensions.	Actual dimensions.		Weight of coil.		Diameter of curve of wire.	
			One end.	Other end.			In coil.	When released.
		" "	" "	" "	*Pounds.*	*Ounces.*	*Inches.*	*Inches.*
Sample 1.	Black...	.10×.10	.0995×.0996	.1001×.1003	32	12	31	(*)
Sample 2.	Tinned .	.10×.10	.0993×.1002	.0992×.0996	33	8	18	36
Sample 3.	Black...	.15×.075	.1500×.0740	.1512×.0755	66	.....	21	54
Sample 4.	Tinned .	.15×.075	.1480×.0743	.1500×.0745	30	.....	17½	42

* Nearly straight.

The surfaces of sample No. 1 were smooth, curvature of corners ".01 to ".02 radius; the larger radius being found at the end of the coil having the largest cross-section dimensions.

Sample 2.—Surfaces smooth; tinning generally smooth and apparently of uniform thickness, although in localities the tinning was thickened, reaching ".0003±.

Sample 3.—Surfaces smooth and corners well rounded to about ".01 radius.

Sample 4.—Surfaces smooth and corners well rounded to about ".01 radius. The tinning apparently well distributed over three surfaces. Along one surface on edge the tinning was thick in places, ".0003±, and in places the wire was naked.

The tinning along the edges was thus defective for a considerable part of its length.

Sample 1.

No. 3772.

Sectional area, ".0995×".0996=.0099 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00072	.00072	.....	.....	
396	40,000	.00147	.00075	.....	.....	
594	60,000	.00215	.00068	.....	.....	
792	80,000	.00287	.00072	.....	.....	
990	100,000	.00361	.00074	.....	.....	
1,188	120,000	.00437	.00076	.....	.....	
1,237	125,000	.00451	.00014	.....	.....	
1,287	130,000	.00468	.00017	.....	.....	
1,336	135,000	.00487	.00019	.....	.....	
1,386	140,000	.00506	.00019	.....	.....	
1,436	145,000	.00526	.00020	.....	.....	
1,485	150,000	.00542	.00016	.....	.....	
1,535	155,000	.00568	.00026	.....	.....	
1,584	160,000	.00588	.00020	.....	.....	
1,634	165,000	.00613	.00025	.....	.....	Elastic limit.
1,683	170,000	.020	.01387	.....	.....	
1,733	175,000	.033	.013	.....	.....	
1,745	176,260	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	176,260
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.026
Elongation per inch under strain at elastic limit	do ..	.00613
Reduction in area after rupture, per centum of original section		50.5
Position of rupture		".95 outside the gauged section
Character of broken surface		fine silky

No. 3773.

Sectional area, ″.0995 × ″.0996 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00078	.00078			
396	40,000	.00152	.00074			
594	60,000	.00222	.00070			
792	80,000	.00294	.00072			
990	100,000	.00360	.00066			
1,188	120,000	.00441	.00081			
1,237	125,000	.00459	.00018			
1,287	130,000	.00478	.00019			
1,336	135,000	.00498	.00020			
1,386	140,000	.00518	.00020			
1,436	145,000	.00540	.00022			
1,485	150,000	.00558	.00018			
1,535	155,000	.00578	.00020			
1,584	160,000	.00601	.00023			Elastic limit.
1,634	165,000	.00662	.00061			
1,683	170,000	.022	.01538			
1,733	175,000	.034	.012			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	175,000
Elastic limit per square inch of orignal section	do....	160,000
Elongation per inch after rupture	inch..	.022
Reduction in area after rupture, per centum of original section		50.5
Position of rupture	1″.80 outside the gauged section	
Character of broken surface	fine silky	

No. 3774.

Sectional area, ″.1000 × ″.1000 = .010 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00070	.00070	.....	.....	
400	40,000	.00146	.00076	.....	.....	
600	60,000	.00220	.00074	.....	.....	
800	80,000	.00292	.00072	.....	.....	
1,000	100,000	.00361	.00069	.....	.....	
1,200	120,000	.00436	.00075	.....	.....	
1,250	125,000	.00457	.00021	.....	.....	
1,300	130,000	.00471	.00014	.....	.....	
1,350	135,000	.00492	.00021	.....	.....	
1,400	140,000	.00508	.00016	.....	.....	
1,450	145,000	.00531	.00023	.....	.....	
1,500	150,000	.00554	.00023	.....	.....	
1,550	155,000	.00574	.00020	.....	.....	
1,600	160,000	.00600	.00026	.....	.....	Elastic limit.
1,650	165,000	.01280	.00680	.....	.....	
1,700	170,000	.027	.01420	.....	.....	
1,735	173,500	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	173,500
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	.030
Elongation per inch under strain at elastic limit	do...	.00600
Reduction in area after rupture, per centum of original section		48.0
Position of rupture		″.10 outside the gauged section
Character of broken surface		fine silky

Sample 2.

No. 3775.

Sectional area, ″.1000 × ″.0994 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00066	.00066	.....	.....	
396	40,000	.00142	.00076	.....	.....	
594	60,000	.00213	.00071	.....	.....	
792	80,000	.00284	.00071	.....	.....	
990	100,000	.00364	.00080	.....	.....	
1,188	120,000	.00444	.00080	.....	.....	
1,237	125,000	.00458	.00014	.....	.....	
1,287	130,000	.00483	.00025	.....	.....	
1,336	135,000	.00503	.00020	.....	.....	
1,386	140,000	.00524	.00021	.....	.....	
1,436	145,000	.00545	.00021	.....	.....	
1,485	150,000	.00568	.00023	.....	.....	
1,535	155,000	.00592	.00024	.....	.....	
1,584	160,000	.00618	.00026	.....	.....	
1,634	165,000	.00658	.00040	.....	.....	Elastic limit.
1,683	170,000	.00793	.00135	.....	.....	
1,733	175,000	.01200	.00407	.....	.....	
1,782	180,000	.024	.012	.....	.....	
1,830	184,840	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	184,840
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.025
Elongation per inch under strain at elastic limit	do...	.00658
Reduction in area after rupture, per centum of original section		50.5
Position of rupture		3″.5 outside the gauged section
Character of broken surface		fine silky

No. 3776.

Sectional area, ″.1000×″.0994 = .0099 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
49	5,000	0.	0.	0.	0.	Initial load.
198	20,000	.00070	.00070	.....	.....	
396	40,000	.00144	.00074	.....	.....	
594	60,000	.00220	.00076	.....	.....	
792	80,000	.00290	.00070	.....	.....	
990	100,000	.00371	.00081	.....	.....	
1,188	120,000	.00445	.00074	.....	.....	
1,287	125,000	.00463	.00018	.....	.....	
1,287	130,000	.00485	.00022	.....	.....	
1,336	135,000	.00503	.00018	.....	.....	
1,386	140,000	.00531	.00028	.....	.....	
1,436	145,000	.00551	.00020	.....	.....	
1,485	150,000	.00579	.00018	.....	.....	
1,535	155,000	.00599	.00020	.....	.....	
1,584	160,000	.00624	.00025	.....	.....	
1,634	165,000	.00663	.00039	.....	.....	Elastic limit.
1,683	170,000	.00805	.00142	.....	.....	
1,733	175,000	.01285	.00450	.....	.....	
1,782	180,000	.027	.01445	.....	.....	
1,831	185,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	185,000
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.041
Elongation per inch under strain at elastic limit	do...	.00663
Reduction in area after rupture, per centum of original section		50.5
Position of rupture		1″.05 inside the gauged section
Character of broken surface		fine silky

No. 3777.

Sectional area, ".1003×".0995=.010 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50	5,000	0.	0.	0.	0.	Initial load.
200	20,000	.00074	.00074	.....	.....	
400	40,000	.00143	.00069	.....	.....	
600	60,000	.00216	.00073	.....	.....	
800	80,000	.00291	.00075	.....	.....	
1,000	100,000	.00366	.00075	.....	.....	
1,200	120,000	.00449	.00083	.....	.....	
1,250	125,000	.00466	.00017	.....	.....	
1,300	130,000	.00484	.00018	.....	.....	
1,350	135,000	.00506	.00022	.....	.....	
1,400	140,000	.00526	.00020	.....	.....	
1,450	145,000	.00548	.00022	.....	.....	
1,500	150,000	.00573	.00027	.....	.....	
1,550	155,000	.00595	.00022	.....	.....	
1,600	160,000	.00624	.00029	.....	.....	
1,650	165,000	.00654	.00030	.....	.....	Elastic limit.
1,700	170,000	.00806	.00152	.....	.....	
1,750	175,000	.013	.00494	.....	.....	
1,800	180,000	.024	.011	.....	.....	
1,834	183,400	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	183,400
Elastic limit per square inch of original section	do...	165,000
Elongation per inch after rupture	inch..	.021
Elongation per inch under strain at elastic limit	do...	.00654
Reduction in area after rupture, per centum of original section		48.0
Position of rupture		3".5 outside the gauged section
Character of broken surface		fine silky

Sample 3.

No. 3778.

Sectional area ".0758×".1510=".011 square inch.
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00065	.00065	.....	.....	
440	40,000	.00135	.00070	.....	.....	
660	60,000	.00209	.00074	.....	.....	
880	80,000	.00274	.00065	.....	.....	
1,100	100,000	.00345	.00071	.....	.....	
1,320	120,000	.00424	.00079	.....	.....	
1,375	125,000	.00438	.00014	.....	.....	
1,430	130,000	.00458	.00020	.....	.....	
1,485	135,000	.00479	.00021	.....	.....	
1,540	140,000	.00499	.00020	.....	.....	
1,595	145,000	.00527	.00028	.....	.....	
1,650	150,000	.00547	.00020	.....	.....	
1,705	155,000	.00577	.00030	.....	.....	
1,760	160,000	.00615	.00038	.....	.....	Elastic limit.
1,815	165,000	.00682	.00067	.....	.....	
1,870	170,000	.00855	.00173	.....	.....	
1,925	175,000	.01245	.00390	.....	.....	
1,980	180,000	.022	.00955	.....	.....	
2,035	185,000	.031	.009	.....	.....	
2,058	187,000	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	187,000
Elastic limit per square inch of original section	do ..	160,000
Elongation per inch after rupture	inch..	.027
Elongation per inch under strain at elastic limit	do...	.00615
Reduction in area after rupture, per centum of original section		36.4
Position of rupture		1".90 outside the gauged section
Character of broken surface		fine silky

No. 3779.

Sectional area, ″.1510×″.0756=.011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00071	.00071			
440	40,000	.00138	.00067			
660	60,000	.00212	.00074			
880	80,000	.00282	.00070			
1,100	100,000	.00357	.00075			
1,320	120,000	.00428	.00071			
1,375	125,000	.00444	.00016			
1,430	130,000	.00468	.00024			
1,485	135,000	.00488	.00020			
1,540	140,000	.00511	.00023			
1,595	145,000	.00532	.00021			
1,650	150,000	.00559	.00027			
1,705	155,000	.00589	.00030			
1,760	160,000	.00622	.00033			Elastic limit.
1,815	165,000	.00694	.00072			
1,870	170,000	.00863	.00169			
1,925	175,000	.01180	.00317			
1,980	180,000	.022	.01020			
2,035	185,000	.029	.007			
2,063	187,550					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	187,550
Elastic limit per square inch of original section	do...	160,000
Elongation per inch after rupture	inch..	.031
Elongation per inch under strain at elastic limit	do...	.00622
Reduction in area after rupture, per centum of original section		40.0
Position of rupture		3″.25 outside of the gauged section
Character of broken surface		fine silky

No. 3780.

Sectional area, ″.1510×″.0756=.011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00069	.00069	.....	.....	
440	40,000	.00142	.00073	.....	.....	
660	60,000	.00211	.00069	.....	.....	
880	80,000	.00282	.00071	.....	.....	
1,100	100,000	.00352	.00070	.....	.....	
1,320	120,000	.00428	.00076	.....	.....	
1,375	125,000	.00444	.00016	.....	.....	
1,430	130,000	.00462	.00018	.....	.....	
1,485	135,000	.00484	.00022	.....	.....	
1,540	140,000	.00506	.00022	.....	.....	
1,595	145,000	.00529	.00023	.....	.....	
1,650	150,000	.00559	.00030	.....	.....	
1,705	155,000	.00582	.00023	.....	.....	Elastic limit.
1,760	160,000	.00622	.00040	.....	.....	
1,815	165,000	.00703	.00081	.....	.....	
1,870	170,000	.00918	.00215	.....	.....	
1,925	175,000	.015	.00582	.....	.....	
1,980	180,000	.020	.005	.....	.....	
2,035	185,000	.031	.011	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	185,000
Elastic limit per square inch of original section	do...	155,000
Elongation per inch after rupture	inch..	.022
Elongation per inch under strain at elastic limit	do...	.00582
Reduction in area after rupture, per centum of original section		30.9
Position of rupture		7″.9 outside the gauged section
Character of broken surface		fine silky

Sample 4.

No. 3781.

Sectional area, ″.1483 × ″.0742 = .011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00074	.00074	.....	.....	
440	40,000	.00146	.00072	.....	.....	
660	60,000	.00218	.00072	.....	.....	
880	80,000	.00294	.00076	.....	.....	
1,100	100,000	.00370	.00076	.....	.....	
1,320	120,000	.00464	.00094	.....	.....	
1,375	125,000	.00489	.00025	.....	.....	Elastic limit.
1,430	130,000	.00530	.00041	.....	.....	
1,485	135,000	.00589	.00059	.....	.....	
1,540	140,000	.00685	.00096	.....	.....	
1,595	145,000	.00862	.00177	.....	.....	
1,650	150,000	.01225	.00363	.....	.....	
1,705	155,000	.017	.00475	.....	.....	
1,760	160,000	.023	.006	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	160,000
Elastic limit per square inch of original section	do...	125,000
Elongation per inch after rupture	inch..	.012
Elongation per inch under strain at elastic limit	do...	.00489
Reduction in area after rupture, per centum of original section		40.0
Position of rupture		11″.1 outside the gauged section
Character of broken surface		fine silky

No. 3782.

Sectional area, ″.1484×″.0746=.011 square inch.
Gauged length, 10″.

Applied loads		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00072	.00072	.....	.....	
440	40,000	.00147	.00075	.....	.....	
660	60,000	.00220	.00073	.....	.....	
880	80,000	.00291	.00071	.....	.....	
1,100	100,000	.00368	.00077	.....	.....	
1,320	120,000	.00471	.00103	.....	.....	Elastic limit.
1,375	122,000	.00512	.00041	.....	.....	
1,430	130,000	.00570	.00058	.....	.....	
1,485	135,000	.00648	.00078	.....	.....	
1,540	140,000	.00739	.00091	.....	.....	
1,595	145,000	.00880	.00141	.....	.....	
1,650	150,000	.01138	.00258	.....	.....	
1,690	153,640	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	153,640
Elastic limit per square inch of original section	do...	120,000
Elongation per inch after rupture	inch..	.014
Elongation per inch under strain at elastic limit	do...	.00471
Reduction in area after rupture, per centum of original section		48.2
Position of rupture		1″.25 inside the gauged section
Character of broken surface		fine silky

No. 3783.

Sectional area, ″.1484 × ″.0744 = .011 square inch.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
55	5,000	0.	0.	0.	0.	Initial load.
220	20,000	.00075	.00075	.....	.....	
440	40,000	.00140	.00065	.....	.....	
660	60,000	.00222	.00082	.....	.....	
880	80,000	.00294	.00072	.....	.....	
1,100	100,000	.00369	.00075	.....	.....	
1,320	120,000	.00465	.00096	.....	.....	
1,375	125,000	.00489	.00024	.....	.....	
1,430	130,000	.00519	.00030	.....	.....	Elastic limit.
1,485	135,000	.00559	.00040	.....	.....	
1,540	140,000	.00613	.00054	.....	.....	
1,595	145,000	.00700	.00087	.....	.....	
1,650	150,000	.00878	.00178	.....	.....	
1,705	155,000	.012	.00322	.....	.....	
1,760	160,000	.014	.002	.....	.....	
1,784	162,180	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	162,180
Elastic limit per square inch of original section	do....	130,000
Elongation per inch after rupture	inch..	.008
Elongation per inch under strain at elastic limit	do....	.00519
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		2″.3 outside the gauged section
Character of broken surface		fine silky

TABULATION OF SQUARE AND FLAT TINNED AND UNTINNED STEEL WIRE FROM WASHBURN & MOEN MANUFACTURING COMPANY.

No. of test.	Mark on coil.	Dimensions in inches.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Remarks.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
				Sq. inch.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	" " *Sq. in.*	*Per cent.*		
3772	1	.0995	.0996	.0099	1,634	165,000	1,745	176,260	.26	2.6	.070×.070=.0049	50.5	Fine silky	Coil not tinned.
3773	1	.0995	.0996	.0099	1,584	160,000	1,733	175,000	.23	2.3	.070×.070=.0049	50.5	....do	
3774	1	.1000	.1000	.0100	1,600	160,000	1,735	173,500	.30	3.0	.072×.072=.0052	48.0	....do	
3775	2	.1000	.0994	.0099	1,683	170,000	1,830	184,840	.25	2.5	.070×.070=.0049	50.5	....do	Coil tinned.
3776	2	.1000	.0994	.0099	1,634	165,000	1,831	185,000	.41	4.1	.070×.070=.0049	50.5	... do	
3777	2	.1003	.0995	.0100	1,656	165,000	1,834	183,400	.21	2.1	.072×.072=.0052	48.0	....do	
3778	3	.1510	.0758	.011	1,760	160,000	2,058	187,090	.27	2.7	.120×.058=.0070	36.4	....do	Coil not tinned.
3779	3	.1510	.0756	.011	1,760	160,000	2,063	187,550	.31	3.1	.120×.055=.0066	40.0	....do	
3780	3	.1510	.0756	.011	1,705	155,000	2,035	185,000	.22	2.2	.123×.062=.0076	30.9	....do	
3781	4	.1483	.0742	.011	1,375	125,000	1,760	160,000	.12	1.2	.114×.058=.0066	40.0	....do	Coil tinned.
3782	4	.1484	.0746	.011	1,320	120,000	1,690	153,640	.14	1.4	.110×.052=.0057	48.2	....do	
3783	4	.1484	.0744	.011	1,430	130,000	1,784	162,180	.08	0.8	.112×.050=.0056	49.0	....do	

WIRE IN STORE AT WATERTOWN ARSENAL.

ELECTRICALLY WELDED ".15 SQUARE TINNED STEEL WIRE.

Welds made at the works of the Thomson Electric Welding Company, Lynn, Mass.
Welding burrs removed before testing.

No. of test.	Dimensions of wire.	Sectional area.	Size of welding burr.	Tensile strength.	
				Total.	Per square inch.
	Inch.	*Sq. inch.*	*Inch.*	*Pounds.*	*Pounds.*
2916	.1496×.1503	.0225	.25×.26	2,760	123,670
2917	.1496×.1503	.0225	.23×.24	2,654	117,960
2918	.1496×.1503	.0225	.23×.23	2,704	120,180
2919	.1496×.1503	.0225	.24×.24	2,645	117,560
2920	.1496×.1503	.0225	.23×.24	2,612	116,090
2921	.1496×.1503	.0225	.23×.24	2,805	124,670

All specimens fractured at the welds except No. 2918.

ELECTRICALLY ANNEALED ".15 SQUARE TINNED STEEL WIRE.

Specimens of square tinned steel wire which were annealed in the welding machine but not welded.

No. of test.	Nominal size of wire.	Actual dimensions of wire.	Sectional area.	Tensile strength.		Remarks.
				Total.	Per sq. inch.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	
2922	".15 square..	.1498×.1498	.0224	2,586	115,450	Heated bright red; cooled without borax.
2923	".15 square..	.1500×.1502	.0225	2,597	115,420	Heated to a welding heat, and cooled in clamps with borax.
2924	".15 square..	.1498×.1500	.0225	2,384	105,960	Heated to welding heat and cooled in clamps without borax.
2925	".10 square..	.1000×.1000	.0100	1,485	148,500	Heated bright red, and cooled with borax.
2926	".10 square..	.0998×.0995	.0099	1,432	144,650	Heated to welding heat with borax.
2927	".10 square..	.1000×.1000	.0100	1,428	142,800	Heated to welding heat without borax.
2928	".10 square..	.0998×.0998	.0100	1,399	139,900	Heated bright red without borax.

ALUMINUM,

AND

ALUMINUM BRASS AND BRONZE,

FROM

THE ALUMINUM COMPANY, LIMITED,

OLDBURG, NEAR BIRMINGHAM, ENGLAND.

667

In making the hardness determinations, two different pressures were employed.

The usual pressure, 10,000 pounds, was applied to one specimen each of 10 per cent. aluminum bronze and 3 per cent. aluminum brass; these being Nos. 4191 and 4194 respectively.

The hardness of these specimens is therefore directly comparable with the hardness of other metals as ordinarily reported.

On account of the softness of the pure aluminum specimens, a lower pressure was used on the indenting tool. Four thousand four hundred pounds made a cut extending diametrically nearly across the specimen, therefore no higher pressure was applied, and to furnish data for direct comparisons among these specimens, one piece of each of the aluminum bronze and aluminum brass was indented with the same pressure.

ALUMINUM.

No. 4188.

Mark, ł.
Diameter, ".769.
Sectional area, .464 square inch.
Gauged length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
464	1,000	0.	0.	0.	0.	Initial load.
928	2,000	.000133	.000133	0.	.....	
1,392	3,000	.000267	.000134	.....	.....	
1,856	4,000	.000367	.000100	.....	.....	
2,320	5,000	.000517	.000150	.000033	.000033	Elastic limit.
2,784	6,000	.000750	.000167	.....	.....	
3,248	7,000	.001183	.000433	.000500	.000467	
3,712	8,000	.002083	.000900	.....	.....	
4,176	9,000	.003967	.001884	.....	.....	
4,640	10,000	.006250	.002283	.005133	.004633	
5,104	11,000	.009883	.003633	.....	.....	
5,568	12,000	.013600	.003717	.012167	.007034	
6,032	13,000	.020100	.012500	.....	.....	Surface presents wavy appearance.
6,496	14,000	.027417	.007317	.025667	.013500	
6,960	15,000	.0350	.007583	.....	.....	
7,424	16,000	.0500	.0150	.....	.....	
7,888	17,000	.0700	.0200	.....	.....	
8,352	18,000	.1167	.0467	.....	.....	
8,560	18,450	.....	.....	.....	.....	Tensile strength.

General summary.

Specific gravity		2.7199
Hardness, under pressure of 4,400 pounds		4.63
Tensile strength per square inch of original section	pounds	18,450
Elastic limit per square inch of original section	do	5,000
Elongation per inch after rupture	inch	.1867
Elongation per inch under strain at elastic limit	do	.000517
Reduction in diameter at point of rupture	do	.149
Reduction in area after rupture, per centum of original section		34.9
Position of rupture		".5 from neck
Character of broken surface		silky; oblique
Elongation of inch sections		".30", ".18, ".20, ".17, ".15, ".12

ALUMINUM.

No. 4189.

Marks, 2.
Diameter, ".788.
Sectional area, .488 square inch.
Gauged length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
488	1,000	0.	0.	0.	0.	Initial load.
976	2,000	.000117	.000117	0.		
1,464	3,000	.000200	.000083			
1,952	4,000	.000300	.000100	0.		
2,440	5,000	.000383	.000083			
2,928	6,000	.000483	.000100	0.		
3,416	7,000	.000633	.000150	0.		
3,904	8,000	.000800	.000167	.000650	.000050	Elastic limit.
4,392	9,000	.001000	.000200			
4,880	10,000	.001817	.000817	.000833	.000783	
5,368	11,000	.003167	.001350			
5,856	12,000	.005050	.001883	.003833	.003000	
6,344	13,000	.008800	.003750			
6,832	14,000	.013800	.005000	.012300	.008467	
7,320	15,000	.020417	.006617			
7,808	16,000	.029517	.009100	.027783	.015483	Surface presents wavy appearance.
8,296	17,000	.0467	.017183			
8,784	18,000	.0833	.0366			
8,920	18,280					Tensile strength.

General summary.

Specific gravity		2.7342
Hardness, under pressure of 4,400 pounds		4.25
Tensile strength per square inch of original section	pounds..	18,280
Elastic limit per square inch of original section	do...	8,000
Elongation per inch after rupture	inch..	.1817
Elongation per inch under strain at elastic limit	do...	.000800
Reduction in diameter at point of rupture	do...	.248
Reduction in area after rupture, per centum of original section		53.1
Position of rupture		2".8 from neck
Character of broken surface		silky; oblique
Elongation of inch sections		".16, ".49", ".22, ".10, ".07, ".05

ALUMINUM.

No. 4190.

Mark, 3.
Diameter, ".779.
Sectional area, .477 square inch.
Gauged length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
477	1,000	0.	0.	0.	0.	Initial load.
954	2,000	.000117	.000117	0.	.....	
1,431	3,000	.000200	.000083	.....	.....	
1,908	4,000	.000300	.000100	0.	.....	
2,385	5,000	.000383	.000083	.....	.....	
2,862	6,000	.000467	.000084	0.	.....	Elastic limit.
3,339	7,000	.000633	.000166	.....	.....	
3,816	8,000	.000850	.000217	.000133	.000133	
4,293	9,000	.001233	.000383	.....	.....	
4,770	10,000	.002050	.000817	.001083	.000950	
5,247	11,000	.003133	.001083	.....	.....	
5,724	12,000	.005283	.002150	.004050	.002967	
6,201	13,000	.008767	.003484	.....	.....	
6,678	14,000	.013800	.005033	.....	.....	
7,155	15,000	.019717	.005917	.....	.....	
7,632	16,000	.030533	.010816	.....	.....	
8,109	17,000	.0467	.016167	.....	.....	
8,586	18,000	.0783	.0316	.....	.....	
8,770	18,390	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	18,390
Elastic limit per square inch of original section	do...	6,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.000467
Reduction in diameter at point of rupture	do...	.119
Reduction in area after rupture, per centum of original section		28.3
Position of rupture		4" from neck
Character of broken surface		silky, oblique
Elongation of inch sections		".07, ".09, ".07, ".08, ".10, ".22*

10 PER CENT. ALUMINUM BRONZE.

No. 4191.

Marks, 4–10.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000300	.000300			
5,000	10,000	.000633	.000333	.000017	.000017	
7,500	15,000	.001000	.000367	.000033	.000016	
9,000	18,000	.001150	.000150			
9,500	19,000	.001200	.000050			Elastic limit.
10,000	20,000	.001467	.000267	.000150	.000117	
10,500	21,000	.001600	.000133			
11,000	22,000	.001800	.000200			
11,500	23,000	.002033	.000233			
12,000	24,000	.002367	.000334			
12,500	25,000	.002833	.000466	.001033	.000883	
13,000	26,000	.003200	.000367			
13,500	27,000	.003833	.000633			
14,000	28,000	.004500	.000667			
14,500	29,000	.005300	.000800			
15,000	30,000	.006367	.001067	.003807	.002834	
15,500	31,000	.007117	.000850			
16,000	32,000	.008033	.000916			
16,500	33,000	.009583	.001550			
17,000	34,000	.010667	.001084			
17,500	35,000	.012500	.001833	.009167	.005300	
18,000	36,000	.013167	.000667			
18,500	37,000	.016000	.002833			
19,000	38,000	.018083	.002083			
19,500	39,000	.020333	.002250			
20,000	40,000	.023117	.002784	.018350	.009783	
20,500	41,000	.0267	.002583			
21,000	42,000	.0292	.0025			
21,500	43,000	.0317	.0025			
22,000	44,000	.0350	.0033			
22,500	45,000	.0383	.0033			
23,000	46,000	.0433	.0050			
23,500	47,000	.0483	.0050			
24,000	48,000	.0517	.0034			
24,500	49,000	.0550	.0033			
25,000	50,000	.0617	.0067			
25,500	51,000	.0667	.0050			
26,000	52,000	.0700	.0033			
26,500	53,000	.0767	.0067			
27,000	54,000	.0833	.0066			
27,500	55,000	.0883	.0050			
28,000	56,000	.0950	.0067			
28,500	57,000	.1000	.0050			
29,000	58,000	.1067	.0067			
29,500	59,000	.1133	.0066			
30,000	60,000	.1200	.0067			
30,500	61,000	.1300	.0100			
31,000	62,000	.1383	.0083			
31,500	63,000	.1467	.0084			
32,000	64,000	.1550	.0083			
32,500	65,000	.1650	.0100			
33,000	66,000	.1783	.0133			
33,500	67,000	.1867	.0084			
34,000	68,000	.2000	.0133			
34,500	69,000	.2167	.0167			
34,840	69,680					Tensile strength.

General summary.

Specific gravity	7.6292
Hardness, under pressure of 10,000 pounds	8.09
Tensile strength per square inch of original section, pounds	69,680
Elastic limit per square inch of original section, inch	19,000
Elongation per inch after rupture, do	.2067
Elongation per inch under strain at elastic limit, do	.001200
Reduction in diameter at point of rupture, do	.028
Reduction in area after rupture, per centum of original section	6.8
Position of rupture	at neck

Character of broken surface, light yellow color, uniformly fine silky. Five radial cracks extending in a longitudinal direction a maximum length of ″.7 were developed at the place of rupture. These cracks began to open at 50,000 pounds per square inch stress. The walls of the cracks were smooth. 1″.5 from the end opposite the fracture the specimen was drawn down to ″.70 diameter.

Elongation of inch sections, ″.25, ″.27, ″.21, ″.18, ″.16, ″.17

10 PER CENT. ALUMINUM BRONZE.

No. 4192.

Marks, 5–10.
Diameter, ″.795.
Sectional area, .496 square inch.
Gauged length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
496	1,000	0.	0.	0.	0.	Initial load.
2,480	5,000	.000260	.000260	0.	.....	
4,960	10,000	.000583	.000323	0.	.....	
7,440	15,000	.000933	.000350	.000033	.000033	
7,936	16,000	.001033	.000100	.....	.....	
8,432	17,000	.001100	.000067	.....	.....	
8,928	18,000	.001200	.000100	.....	.....	
9,424	19,000	.001300	.000100	.....	.....	
9,920	20,000	.001383	.000083	.000150	.000117	
10,416	21,000	.001467	.000084	.....	.....	Elastic limit (approximate).
10,912	22,000	.001633	.000166	.....	.....	
11,408	23,000	.001783	.000150	.....	.....	
11,904	24,000	.001900	.000117	.....	.....	
12,400	25,000	.002067	.000167	.000480	.000333	
12,896	26,000	.002217	.000150	.....	.....	
13,392	27,000	.002467	.000150	.....	.....	
13,888	28,000	.002800	.000333	.....	.....	
14,384	29,000	.003167	.000367	.....	.....	
14,880	30,000	.003633	.000466	.001567	.001084	
15,872	32,000	.004667	.001034	.....	.....	
16,864	34,000	.005967	.001300	.....	.....	
17,856	36,000	.008017	.002050	.....	.....	
18,848	38,000	.010367	.002350	.....	.....	
19,840	40,000	.013133	.002766	.009467	.007900	
20,832	42,000	.015833	.002700	.....	.....	
21,824	44,000	.019800	.003967	.....	.....	
22,816	46,000	.024367	.004567	.....	.....	
23,808	48,000	.029333	.004966	.....	.....	
24,800	50,000	.035750	.006417	0.30533	.021066	Specimen drawing down at each neck.
25,792	52,000	.0450	.009250	.....	.....	
26,784	54,000	.0517	.0067	.....	.....	
27,776	56,000	.0617	.0100	.....	.....	
28,768	58,000	.0700	.0083	.....	.....	
29,760	60,000	.0817	.0117	.....	.....	
30,752	62,000	.0950	.0133	.....	.....	
31,744	64,000	.1117	.0167	.....	.....	
32,736	66,000	.1283	.0166	.....	.....	Tensile strength.

General summary.

Specific gravity	7.5773
Hardness, under pressure of 4,400 pounds	27.99
Tensile strength per square inch of original section ..... pounds..	66,000
Elastic limit per square inch of original section ..... do...	21,000
Elongation per inch after rupture ..... inch..	.1217
Elongation per inch under strain at elastic limit ..... do...	.001467
Reduction in diameter at point of rupture ..... do...	.125
Reduction in area after rupture, per centum of original section	28.8
Position of rupture	2″ from neck
Character of broken surface	oblique silky, light yellow color
Elongation of inch sections	″.21, ″.11, ″.11, ″.10 ″.08, ″.13

10 PER CENT. ALUMINUM BRONZE

No. 4193.

Marks, 6–10.
Diameter, ".798.
Sectional area, .50 square inch.
Gauged length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000267	.000267	0.	.....	
5,000	10,000	.000600	.000333	0.	.....	
7,000	15,000	.000983	.000383	.000083	.000083	
8,000	16,000	.001083	.000100	.....	.....	
8,500	17,000	.001183	.000100	.....	.....	
9,000	18,000	.001300	.000117	.....	.....	Elastic limit.
9,500	19,000	.001450	.000150	.....	.....	
10,000	20,000	.001600	.000150	.000300	.000217	
10,500	21,000	.001733	.000133	.....	.....	
11,000	22,000	.001950	.000217	.....	.....	
11,500	23,000	.002200	.000250	.....	.....	
12,000	24,000	.002517	.000317	.....	.....	
12,500	25,000	.002950	.000433	.001233	.000933	
13,000	26,000	.003333	.000383	.....	.....	
13,500	27,000	.003900	.000567	.....	.....	
14,000	28,000	.004650	.000750	.....	.....	
14,500	29,000	.005317	.000667	.....	.....	
15,000	30,000	.006217	.000900	.003883	.002650	
16,000	32,000	.008217	.002000	.....	.....	
17,000	34,000	.010900	.002683	.....	.....	
18,000	36,000	.014400	.003500	.....	.....	
20,000	40,000	.024300	.009900	.020383	.016450	
21,000	42,000	.029667	.005367	.....	.....	
22,000	44,000	.036500	.006833	.....	.....	
23,000	46,000	.043833	.007333	.....	.....	
24,000	48,000	.052167	.008334	.....	.....	
25,000	50,000	.061667	.009500	.055667	.035334	
26,000	52,000	.0717	.010033	.....	.....	
27,000	54,000	.0817	.0100	.....	.....	
28,000	56,000	.0933	.0116	.....	.....	
29,000	58,000	.1033	.0100	.....	.....	
30,000	60,000	.1167	.0134	.....	.....	
31,000	62,000	.1300	.0133	.....	.....	
32,000	64,000	.1467	.0167	.....	.....	
32,440	64,880	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section.....pounds.. 64,880
Elastic limit per square inch of original section.....do... 18,000
Elongation per inch after rupture.....inch.. .1383
Elongation per inch under strain at elastic limit.....do... .001300
Reduction in diameter at point of rupture.....do... .078
Reduction in area after rupture, per centum of original section..... 18.06
Position of rupture.....".45 from neck
Character of broken surface.....silky, light yellow color. A small hole at center of bar about ".04 diameter by ".10 long. In the head of this specimen, near which the fracture occurred, there was a cavity at the center of the metal 1".7 deep, the opposite head had a cavity ½" deep.
Elongation of inch sections.....".12, ".11, ".16, ".12, ".12, ".19

3 PER CENT. ALUMINUM BRASS.

No. 4194.

Marks, 7–3.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000283	.000283	0.	.....	
5,000	10,000	.000617	.000334	0.	.....	
7,500	15,000	.000967	.000350	0.	.....	
8,000	16,000	.001050	.000083	.....	.....	
8,500	17,000	.001133	.000083	.....	.....	Elastic limit.
9,000	18,000	.001267	.000134	.....	.....	
9,500	19,000	.001383	.000116	.....	.....	
10,000	20,000	.001633	.000250	.000217	.000217	
10,500	21,000	.001833	.000200	.....	.....	
11,000	22,000	.002283	.000450	.....	.....	
11,500	23,000	.002833	.000550	.....	.....	
12,000	24,000	.003517	.000684	.....	.....	
12,500	25,000	.004200	.000683	.002117	.001900	
13,000	26,000	.004667	.000467	.....	.....	
13,500	27,000	.005900	.001233	.....	.....	
14,000	28,000	.007300	.001400	.....	.....	
14,500	29,000	.008533	.001233	.....	.....	
15,000	30,000	.010300	.001767	.007467	.005350	
16,000	32,000	.014433	.004133	.....	.....	
17,000	34,000	.019617	.005184	.....	.....	
18,000	36,000	.026317	.006700	.....	.....	
19,000	38,000	.0367	.010333	.....	.....	
20,000	40,000	.0467	.0100	.....	.....	
21,000	42,000	.0550	.0083	.....	.....	
22,000	44,000	.0667	.0117	.....	.....	
23,000	46,000	.0833	.0166	.....	.....	
24,000	48,000	.0967	.0134	.....	.....	
25,000	50,000	.1150	.0183	.....	.....	
26,000	52,000	.1333	.0183	.....	.....	Tensile strength.

General summary.

Specific gravity		8.1589
Hardness, under pressure of 10,000 pounds		6.12
Tensile strength per square inch of original section	pounds..	52,000
Elastic limit per square inch of original section	do...	17,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.001133
Reduction in diameter at point of rupture	do...	.128
Reduction in area after rupture, per centum of original section		29.4
Position of rupture		″25 from neck
Character of broken surface		irregular surface, light yellow, approaching lavender color at the circumference, center of fracture golden yellow.
Elongation of inch sections		″.12, ″.12, ″.12, ″.12, ″.12, ″.24*

3 PER CENT. ALUMINUM BRASS.

No. 4195.

Marks, 8–3.
Diameter, ".798.
Sectional area, .50 square inch.
Gauged length, 6".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000283	.000283	0.	.....	
5,000	10,000	.000633	.000350	0.	.....	
7,500	15,000	.001017	.000384	0.	.....	
8,000	16,000	.001133	.000116	.....	.....	
8,500	17,000	.001217	.000084	.....	.....	
9,000	18,000	.001300	.000083	.....	.....	Elastic limit.
9,500	19,000	.001467	.000167	.....	.....	
10,000	20,000	.001633	.000166	.000133	.000133	
10,500	21,000	.001783	.000150	.....	.....	
11,000	22,000	.002017	.000234	.....	.....	
11,500	23,000	.002283	.000266	.....	.....	
12,000	24,000	.002600	.000317	.....	.....	
12,500	25,000	.002900	.000300	.000633	.000700	
13,000	26,000	.003117	.000217	.....	.....	
13,500	27,000	.003667	.000550	.....	.....	
14,000	28,000	.004083	.000416	.....	.....	
14,500	29,000	.004667	.000584	.....	.....	
15,000	30,000	.005217	.000550	.002467	.001634	
16,000	32,000	.006467	.001250	.....	.....	
17,000	34,000	.008683	.002216	.....	.....	
18,000	36,000	.011167	.002484	.....	.....	
19,000	38,000	.015117	.003950	.....	.....	
20,000	40,000	.019000	.003883	.015183	.012066	
21,000	42,000	.024300	.005300	.....	.....	
22,000	44,000	.031700	.007400	.....	.....	
23,000	46,000	.0400	.0083	.....	.....	
24,000	48,000	.0483	.0083	.....	.....	
25,000	50,000	.0600	.0117	.....	.....	
26,000	52,000	.0717	.0117	.....	.....	
26,120	52,240	.....	.....	.....	.....	Tensile strength.

General summary.

Specific gravity		8.0795
Hardness under pressure of 4,400 pounds		27.32
Tensile strength per square inch of original section	pounds..	52,240
Elastic limit per square inch of original section	do...	18,000
Elongation per inch after rupture	inch..	.0717
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.066
Reduction in area after rupture, per centum of original section		14.0
Position of rupture		".15 from neck
Character of broken surface		Irregular vesicular surface, in part light lavender color, with part golden yellow color; 50 per cent. each.
Elongation of inch sections		".07, ".06, ".06, ".07, ".07, ".10

3 PER CENT. ALUMINUM BRASS.

No. 4196.

Marks, 9–13.
Diameter, .798.
Sectional area, .50 square inch.
Gauged length, 6″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	0.	0.	Initial load.
2,500	5,000	.000317	.000317	0.	.....	
5,000	10,000	.000667	.000350	0.	.....	
7,500	15,000	.001083	.000416	.000017	.000017	
8,000	16,000	.001167	.000084	.....	.....	
8,500	17,000	.001267	.000100	.....	.....	
9,000	18,000	.001383	.000116	.....	.....	Elastic limit.
9,500	19,000	.001533	.000150	.....	.....	
10,000	20,000	.001700	.000167	.000217	.000200	
10,500	21,000	.001867	.000167	.....	.....	
11,000	22,000	.002150	.000283	.....	.....	
11,500	23,000	.002517	.000367	.....	.....	
12,000	24,000	.002817	.000300	.....	.....	
12,500	25,000	.003283	.000466	.001117	.000900	
13,000	26,000	.003533	.000250	.....	.....	
13,500	27,000	.004233	.000700	.....	.....	
14,000	28,000	.004750	.000517	.....	.....	
14,500	29,000	.005417	.000667	.....	.....	
15,000	30,000	.006183	.000766	.003333	.002216	
16,000	32,000	.007917	.001734	.....	.....	
17,000	34,000	.010517	.002600	.....	.....	
18,000	36,000	.014150	.003633	.....	.....	
19,000	38,000	.018300	.004150	.....	.....	
20,000	40,000	.023633	.005333	.....	.....	Crack opened in stem.
21,000	42,000	.0317	.008067	.....	.....	
22,000	44,000	.0383	.0066	.....	.....	
22,490	44,980	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	44,980
Elastic limit per square inch of original section	do...	18,000
Elongation per inch after rupture	inch..	.0483
Elongation per inch under strain at elastic limit	do...	.001383
Reduction in diameter at point of rupture	do...	.088
Reduction in area after rupture, per centum of original section		20.8
Position of rupture		″.45 from neck

Character of broken surface.....irregular, vesicular surface, 60 per cent.; light lavender color, 40 per cent. golden-yellow metal in radial markings. Fracture occurred at a crack observed during progress of test.

Elongation of inch sections.....″.03, ″.03, ″.04, ″.03, ″.03, ″.13*

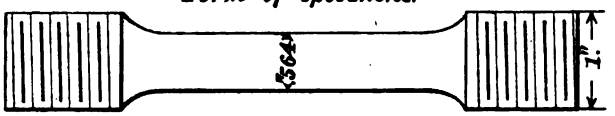
TABULATION OF SPECIMENS OF ALUMINUM AND ALUMINUM BRASS AND BRONZE FROM THE ALUMINUM COMPANY, LIMITED, OLDBURY, NEAR BIRMINGHAM, ENGLAND.

No. of test.	Metal.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Contraction of area.	Elongation in 6 inches.	Appearance of fracture.	Elongation of inch section.	Specific gravity.	Hardness.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per ct.*	*Per ct.*		" " " " " "		
4188	Aluminum	.769	.464	5,000	18,450	34.9	18.7	Silky oblique	.30* .18 .20 .17 .15 .12	2.7199	§4.63
4189	....do	.768	.488	8,000	18,280	53.1	18.2	....do	.16 .49* .22 .10 .07 .05	2.7242	§4.25
4190	....do	.779	.477	6,000	18,390	28.3	10.5	....do	.07 .09 .07 .08 .10 .23*		
4191	10 per cent. aluminum bronze	.798	.50	19,000	69,680	2.8	20.7	Light-yellow color, uniformly fine silky.	.25 .27* .21 .18 .16 .17	7.6292	8.09
4192	....do	.795	.496	21,000	66,000	28.8	12.2	Oblique silky, light yellow	.21* .11 .11 .10 .06 .02	7.5773	§27.99
4193	....do	.798	.50	18,000	64,880	18.6	13.8	Silky, light-yellow color; a small hole at center of bar.	.13 .11 .16 .13 .13 .19*		
4194	3 per cent. aluminum brass	.798	.50	17,000	52,000	29.4	14.0	Irregular surface, light yellow, approaching lavender color at the circumference; center of fracture golden yellow.	.12 .12 .12 .12 .12 .24*	8.1589	6.12
4195	....do	.798	.50	18,000	52,240	14.0	7.2	Irregular vesicular surface, in part light-lavender color and part golden yellow.	.07 .06 .06 .07 .07 .10*	8.0795	§27.32
4196	....do	.798	.50	18,000	44,980	20.8	4.8	Irregular vesicular surface, light-lavender and golden-yellow color.	.03 .03 .04 .03 .03 .03*		

§ Hardness determined under pressure of 4,400 pounds.

TENSILE TEST OF BRONZE SPECIMENS TAKEN FROM FRAGMENT OF FRACTURED TRAY HINGE OF 12″ B. L. CAST IRON RIFLE.

Form of specimens.



No. 3873.

Diameter, ″.564.
Sectional area, .25 square inch.
Elastic limit, 3,120 pounds = 12,480 pounds per square inch.
Tensile strength, 5,540 pounds = 22,160 pounds per square inch.
Elongation in 2 inches, ″.23 = 11.5 per cent.
Elongation of inch sections, ″.13*, ″.10.
Diameter at fracture, ″.51; area, .204 square inch.
Contraction of area, 18.3 per cent.
Fractured at the neck. Appearance, light-yellow color. Opened numerous cracks along surface of stem.

No. 3874.

Diameter, ″.564.
Sectional area, .25 square inch.
Elastic limit, 3,200 pounds = 12,800 pounds per square inch.
Tensile strength, 5,290 pounds = 21,160 pounds per square inch.
Elongation in 3 inches, ″.30 = 10 per cent.
Elongation of inch sections, ″.17*, ″.07, ″.06.
Diameter at fracture, ″.53; area, .221 square inch.
Contraction of area, 11.8 per cent.
Fractured ″.75 from the neck. Appearance, variegated, showing light-yellow, copper-colored, and greenish-brown metal. Opened numerous cracks in the surface of the stem.

BRASS AND STEEL TAPE

FOR

ENGINEER CORPS, U. S. ARMY.

681

No. 3877.

BRASS TAPE.

Dimensions, ″.128×″.0128.
Sectional area, .0016 square inch.
Gauged length, 6″.
Tested with broad faces in a vertical plane.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
20	.....	0.	0.	Initial load.
30	.....	.0036	.0001	
40	.....	.0064	.0012	
60	.....	.0164	.0046	
60	.....	.0157	.....	
40	.....	.0104	.0050	
Tape now tested with broad face in an horizontal plane.				
20	.....	0.	0.	Micrometer reset to zero.
30	.....	.0028	0.	
40	.....	.0043	.0006	
50	.....	.0060	.0011	
60	.....	.0120	.0015	
70	.....	.0157	.0030	
80	.....	.0225	.0063	
90	.....	.0411	.0217	
96	60 000	.....	.....	Tensile strength.

No. 3878.

Steel Tape.

Dimensions, ″.129 × ″.0130.
Sectional area, .0017 square inch.
Gauged length, 6″.
Tested with broad face in an horizontal plane.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
20	.....	0.	0.	Initial load.
30	.....	.0021	.0007	
40	.....	.0034	.0006	
50	.....	.0048	.0005	
60	.....	.0063	.0005	
70	.....	.0074	.0009	
80	.....	.0090	.....	
90	.....	.0104	.....	
100	.....	.0117	.0016	
110	.....	.0136	.....	
120	.....	.0152	.....	
130	.....	.0166	.....	
140	.....	.0177	.....	
150	.....	.0192	.0018	
160	.....	.0209	.....	
170	.....	.0220	.....	
180	.....	.0232	.....	
190	.....	.0248	.....	
200	.....	.0261	.0023	
210	.....	.0281	.....	
220	.....	.0296	.....	
230	.....	.0306	.....	
240	.....	.0321	.....	
260	.....	.0348	.....	
280	.....	.0376	.....	
300	.....	.0403	.0036	
387	227,650	.....	.....	Tensile strength.

ALTERNATE STRAINING, BY TENSION AND COMPRESSION,

OF

STEEL, WROUGHT-IRON, AND CAST-IRON BARS.

Continued from Report of Tests, 1889.

Cast-iron specimens taken from condemned 12-inch mortar body, No. 1.

No. 2760.

Midvale steel bar marked $L_{N_1}^{S\,B_1}M$—first specimen.

(See Report of Tests, 1889, for the first part of this test.)

Rested 10 days, then annealed by heating in muffle over gas burners.

Gauged length, cold ..... 9″.9881

Gauged length, hot 10.0268

Expansion ..... ″.0387

Estimated temperature of annealing 652° F.

Test renewed 10 days after annealing.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0							.00119		Micrometer reset.
70,680	10,000					.00154	.00035			
141,360	20,000					.00185	.00031			
212,040	30,000					.00217	.00032			
282,720	40,000					.00248	.00031			
212,040	30,000					.00217	−.00031			
141,360	20,000					.00185	−.00032			
70,680	10,000					.00154	−.00031	.00119	0.	
70,680	10,000	−.00084	+.00070	−.00117	+.00002					
141,360	20,000	−.00052	.00012	−.00116	.00001					
212,040	30,000	−.00019	.00033	−.00115	.00001					
282,720	40,000	+.00015	.00034	−.00114	.00001					
282,720	40,000					.00240	.00255	.00115	.00001	
318,060	45,000	+.00035	.00275	−.00110	.00005					
318,060	45,000					.00260	.00295	.00115	.00005	
70,680	10,000					.00148	−.00112			
141,360	20,000					.00181	+.00033			
212,040	30,000					.00213	.00032			
282,720	40,000					.00244	.00031			
318,060	45,000					.00260	.00016			
282,720	40,000					.00244	−.00016			
212,040	30,000					.00213	−.00031			
141,360	20,000					.00180	−.00033			

No. 2760—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
70, 680	10, 000					.00150	—.00030	.00115	0.	
70, 680	10, 000	—.00079	+.00071							
141, 360	20, 000	—.00049	.00030							
212, 040	30, 000	—.00013	.00036							
282, 720	40, 000	+.00019	.00032							
318, 060	45, 000	.00035	.00016							
282, 720	40, 000	.00021	—.00014							
212, 040	30, 000	—.00018	—.00034							
141, 360	20, 000	—.00046	—.00033							
70, 680	10, 000	—.00077	—.00031	—.00112	+.00003					
325, 128	46, 000	+.00040	+.00117							
332, 196	47, 000	.00043	.00003							
339, 264	48, 000	.00047	.00004							
346, 332	49, 000	.00051	.00004							
353, 400	50, 000	.00057	.00006	—.00106	.00004					
70, 680	10, 000					.00142	.00199	.00107	.00001	
141, 360	20, 000					.00173	.00031	.00110	.00003	
212, 040	30, 000					.00208	.00035	.00111	.00001	
282, 720	40, 000					.00240	.00032	.00112	.00001	
353, 400	50, 000					.00274	.00034	.00115	.00003	
353, 400	50, 000	.00060	.00334	—.00103	.00012					
353, 400	50, 000					.00275	.00335	.00115	.00002	
353, 400	50, 000	.00065	.00340	—.00098	.00017					
353, 400	50, 000					.00275	.00340	.00113	.00015	
353, 400	50, 000	.00072	.00347							
	50, 000	.00073	.00001	—.00092	.00021					After 3 minutes.
353, 400	50, 000					.00275	.00348			
	50, 000					.00275	0.	.00112	.00020	After 3 minutes.
353, 400	50, 000	.00082	.00357	—.00085	.00027					
353, 400	50, 000					.00274	.00356	.00111	.00026	
353, 400	50, 000	.00093	.00367	—.00075	.00036					
353, 400	50, 000	.00095	.00002	—.00071	.00004					
353, 400	50, 000	.00100	.00005	—.00071	0.					
353, 400	50, 000	.00100	0.							
360, 468	51, 000	.00112	.00012							
367, 536	52, 000	.00146	.00034							
	52, 000	.00167	.00021	—.00013	.00058					After 3 minutes.
141, 360	20, 000					.00098	.00260	.00030	.00017	
212, 040	30, 000					.00143	.00050	.00045	.00015	

353,400	50,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
353,400	50,000	.00165	.00417	— .00010	.00005	.....	.....	.....	.....	.....
374,604	53,000	.01247	.00082	.....	.....	.....	.....	.....	.....	.....
381,672	54,000	.00305	.00058	.....	.....	.....	.....	.....	.....	.....
353,400	50,000	.00294	— .00011	.....	.....	.....	.....	.....	.....	.....
282,720	40,000	.00260	— .00034	.....	.....	.....	.....	.....	.....	.....
212,040	30,000	.00225	— .00035	.....	.....	.....	.....	.....	.....	.....
141,360	20,000	.00190	— .00035	.....	.....	.....	.....	.....	.....	.....
70,680	10,000	.00152	— .00038	.00110	.00120	.....	.....	.....	.....	.....
70,680	10,000	.....	.....	.....	.....	— .00066	.00064	— .00100	.00010	
141,360	20,000	.....	.....	.....	.....	— .00020	.00048	— .00083	.00017	
212,040	30,000	.....	.....	.....	.....	+ .00048	.00068	— .00060	.00033	
70,680	10,000	.00088	.00186	.00052	.00002	.....	.....	.....	.....	
141,360	20,000	.00125	.00037	.00055	.00003	.....	.....	.....	.....	
212,040	30,000	.00165	.00040	.00060	.00005	.....	.....	.....	.....	
282,720	40,000	.00218	.00048	.00073	.00012	.....	.....	.....	.....	
353,400	50,000	.00273	.00060	.00092	.00020	.....	.....	.....	.....	

This load sustained 2 hours.

Test discontinued.

No. 2762.

Midvale steel bar marked $\frac{N191}{R}$ First specimen.
(See report 1889 for the first part of this test.)
Rested 3 months and 20 days, then annealed.
Gauged length cold..... 9.9560
Gauged length hot..... 10.0296

Expansion ..... .0736
Estimated annealing temperature, 1180° F., which was maintained 2 hours. Test resumed 9 days after annealing.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0							.00440		Micrometer reset.
70,680	10,000					.00465	.00025			
141,360	20,000					.00491	.00026			
212,040	30,000					.00519	.00027			
282,720	40,000					.00550	.00031			
212,040	30,000					.00518	—.00032			
141,360	20,000					.00493	—.00025			
70,680	10,000					.00465	—.00028	.00440	0.	
70,680	10,000	—.00401	.00054	—.00436	.00004					
141,360	20,000	—.00373	.00028	—.00436	0.					
212,040	30,000	—.00339	.00034	—.00433	.00003					
282,720	40,000	—.00306	.00033	—.00434	—.00001					
282,720	40,000					.00353	.00247	.00439	.00005	
282,720	40,000	—.00305	.00248	—.00434	.00005					
318,060	45,000	—.00292	.00013	—.00431	.00003					
318,060	45,000					.00586	.00274	.00439	.00008	
318,060	45,000	—.00286	.00280							Considerable scale started off surface of bar.
325,128	46,000	—.00280	.00006							
332,196	47,000	—.00278	.00002							
339,264	48,000	—.00277	.00001	—.00431	.00008					
346,332	49,000	—.00271	.00006							
354,400	50,000	—.00266	.00005	—.00429	.00002					
353,400	50,000					.00586	.00320	.00440	.00011	
70,680	10,000	—.00397	.00189							
141,360	20,000	—.00367	.00030							

212, 040	30, 000	—.00330	.00037							
282, 720	40, 000	—.00298	.00032							
353, 400	50, 000	—.00263	.00035							
282, 720	40, 000	—.00295	—.00032							
212, 040	30, 000	—.00322	—.00027							
141, 360	20, 000	—.00355	—.00033							
70, 680	10, 000	—.00388	—.00033	—.00426	.00014					
141, 360	20, 000	—.00362	+.00026							
282, 720	40, 000	—.00297	.00065							
141, 360	20, 000	—.00357	—.00060	—.00427	—.00001					
70, 680	10, 000					.00453	.00096			
141, 360	20, 000					.00488	.00035			
212, 040	30, 000					.00520	.00032			
282, 720	40, 000					.00553	.00033			
353, 400	50, 000					.00589	.00036			
282, 720	40, 000					.00556	—.00033			
212, 040	30, 000					.00525	—.00031			
141, 360	20, 000					.00496	—.00029			
70, 680	10, 000					.00469	—.00027	.00440	0.	
353, 400	50, 000	—.00258	.00211							
360, 468	51, 000	—.00247	.00011							
		+.00145	.00392							After 2 minutes.
367, 530	52, 000	.00229	.00084							
353, 400	50, 000	.00223	—.00006	.00031	.00471					
70, 680	10, 000					.00009	.00232	—.00014	.00017	
141, 360	20, 000					.00085	.00074	+.00021	.00035	
212, 040	30, 000					.00204	.00121	.00101	.00080	
282, 720	40, 000					.00380	.00176	.00245	.00144	
70, 680	10, 000	—.00205	.00175	—.00237	.00008					
141, 360	20, 000	—.00165	.00040	—.00227	.00010					
212, 040	30, 000	—.00100	.00065	—.00208	.00019					
282, 720	40, 000	—.00013	.00087	—.00158	.00050					
70, 680	10, 000					.00192	.00179	.00166	.00008	
141, 360	20, 000					.00232	.00040	.00175	.00009	
353, 400	50, 000					.00683	.00451	.00507	.00332	

Test again discontinued.

No. 2763.

Bar marked, $\frac{N}{R}\,^{191}$ second specimen.

(See Report 1889 for the first part of this test.)

Test resumed after resting 3 months and 21 days without load.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	.00380						Micrometer reset.
70,680	10,000	.00409	.00029							
141,360	20,000	.00442	.00034							
212,040	30,000	.00477	.00035							
282,720	40,000	.00513	.00036							
353,400	50,000	.00551	.00038							
282,720	40,000	.00518	—.00033							
212,040	30,000	.00485	—.00033							
141,360	20,000	.00449	—.00036							
70,680	10,000	.00417	—.00032	.00285	.00005					
70,680	10,000					—.00319	.00068	—.00383	.00002	
141,360	20,000					—.00297	.00052	—.00364	.00019	
212,040	30,000					—.00210	.00087	—.00311	.00053	
282,720	40,000					—.00043	.00167	—.00180	.00131	
282,720	40,000	.00384	.00341	.00244	.00064					
70,680	10,000					—.00210	.00174	—.00241	.00003	
141,360	20,000					—.00167	.00057	—.00233	.00008	

original length.

These sections were measured before and after annealing with the following results.

Number of gauged length.	Before annealing.	After annealing.	Difference.
	Inches.	*Inches.*	*Inch.*
1	10.0015	10.0013	−.0002
2	9.9977	9.9979	+.0002
3	9.9945	9.9948	+.0003
Means	9.9979	9.9980	+.0001

The annealing was done by heating the bar in an oil bath. The temperature gradually brought up to 278° F., and then slowly cooled.

After annealing the bar was rested a period of 1 month and 17 days, and test was then resumed.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.		Micrometer reset to zero.
70,680	10,000					.00042	.00042	0.	0.	
70,680	10,000	.00039	.00081	.00001	.00001					
106,020	15,000					.00055	.00094	0.	.00001	
106,020	15,000	.00052	.00107	.00001	.00001					
141,360	20,000					.00066	.00118	0.	.00001	
141,360	20,000	.00073	.00139	.00002	.00002					
176,700	25,000					.00081	.00154	—.00001	.00001	
176,700	25,000	.00090	.00171	.00001	0.					
212,040	30,000					.00099	.00189	—.00001	0.	
212,040	30,000	.00109	.00208	.00002	.00001					
247,380	35,000					.00113	.00222	—.00002	0.	
247,380	35,000	.00127	.00240	.00003	.00001					
282,720	40,000					.00129	.00256	0.	.00003	
282,720	40,000	.00144	.00273	.00002	.00002					
318,060	45,000					.00148	.00292	0.	.00002	
318,060	45,000	.00162	.00310	.00005	.00005					
353,400	50,000					.00176	.00338	.00008	.00013	
353,400	50,000	.00187	.00363	.00017	.00025					
360,468	51,000					.00198	.00385			
367,536	52,000					.00213	.00015			
374,604	53,000					.00312	.00099	.00134	.00151	
70,680	10,000	—.00085	.00227	—.00123	.00011					
106,020	15,000	—.00060	.00025	—.00114	.00009					
141,360	20,000	—.00036	.00024	—.00106	.00008					
141,360	20,000					.00179	.00143	.00113	.00007	
212,040	30,000	.00022	.00191	—.00085	.00028					
212,040	30,000					.00195	.00217	.00098	.00013	
282,720	40,000					.00240	.00045	.00106	.00008	
282,720	40,000	.00099	.00339	—.00043	.00063					
353,400	50,000	.00213	.00114	+.00032	.00075					
353,400	50,000					.00298	.00511	.00127	.00159	
374,604	53,000	.00280	.00578							
381,672	54,000	.00350	.00070							
388,740	55,000	.00400	.00050	.00195						
70,680	10,000					—.00142	.00258	—.00177	.00018	
388,740	55,000	.00419	.00277	.00215	.00038					

Test discontinued.

No. 2765.

Midvale steel bar marked $\frac{S\ B\ 3}{L,M.}$ Second specimen.
(See Report 1889 for the first part of this test.)
Rested 3 months and 14 days, then annealed.

Gauged length, cold..... 10″.0624
Gauged length, hot..... 10″.0997

Expansion..... ″.0373

Estimated annealing temperature 597°, which was maintained 6 hours.
Test resumed 12 days after annealing.

Applied loads.		Under tensile stress.				Under compression stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	.00624						Micrometer reset.
70,680	10,000					—.00596	.00028	—.00624	0.	
70,680	10,000	.00661	.00037	.00626	.00002					
141,360	20,000					—.00564	.00097	—.00625	.00001	
141,360	20,000	.00697	.00133	.00627	.00002					
212,040	30,000					—.00532	.00165	—.00625	.00002	
212,040	30,000	.00730	.00198	.00628	.00003					
282,720	40,000					—.00501	.00229	—.00626	.00002	
282,720	40,000	.00766	.00265	.00628	.00002					
318,060	45,000					—.00485	.00281	—.00627	.00001	
318,060	45,000	.00783	.00298	.00628	.00001					
353,400	50,000					—.00468	.00315	—.00626	.00002	
353,400	50,000	.00801	.00333	.00627	.00001					
388,740	55,000					—.00440	.00361	—.00620	.00007	
388,740	55,000	.00820	.00380	.00630	.00010					
395,808	56,000					—.00415	.00405			
402,876	57,000					—.00367	.00048			
409,944	58,000					—.00322	.00045	—.00620	.00010	
70,680	10,000	.00564	.00242	.00529	.00009					
141,360	20,000	.00613	.00049	.00542	.00013					
70,680	10,000					—.00509	.00104	—.00541	.00001	
141,360	20,000					—.00475	.00034	—.00540	.00001	
212,040	30,000	.00670	.00195	.00565	.00025					

No. 2765—Continued.

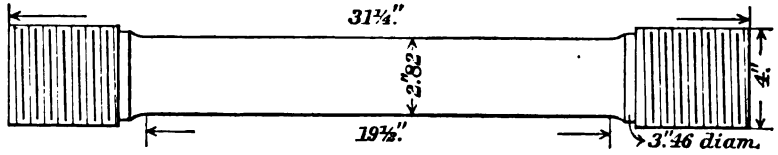
Applied loads.		Under tensile stress.				Under compression stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
212, 040	30, 000					—.00451	.00219	—.00558	.00007	
282, 720	40, 000	.00738	.00287	.00597	.00039					
282, 720	40, 000					—.00441	.00297	—.00572	.00025	
353, 400	50, 000	.00829	.00388	.00650	.00078					
388, 740	55, 000	.00915	.00086	.00715	.00065					
388, 740	55, 000					—.00324	.00591	—.00515	.00200	
388, 740	55, 000	.01103	.00679							
	55, 000	.01028	.00925	.00825	.00310					After 3 minutes.
388, 740	55, 000					—.00305	.00723	—.00500	.00325	
388, 740	55, 000	.01107	.00802							
	55, 000	.01128	.00021							After 2 minutes.
	55, 000	.01136	.00008							After 4 minutes.
	55, 000	.01142	.00006							After 6 minutes.
	55, 000	.01146	.00004							After 8 minutes.
	55, 000	.01148	.00002	.00938	.00438					After 10 minutes.
388, 740	55, 000					—.00326	.00822			
	55, 000					—.00316	.00010			After 2 minutes.
	55, 000					—.00315	.00001			After 4 minutes.
	55, 000					—.00311	.00004			After 6 minutes.
	55, 000					—.00310	.00001			
	55, 000					—.00308	.00002	—.00509	.00429	
388, 740	55, 000	.01196	.00825	.00989	.00480					
388, 740	55, 000					—.00342	.00854	—.00545	.00444	
388, 740	55, 000	.01251	.00909							
	55, 000	.01278	.00027	.01062	.00517					After 10 minutes.
388, 740	55, 000					—.00367	.00911	—.00571	.00491	
388, 740	55, 000	.01314	.00947	.01098	.00527					
388, 740	55, 000					—.00387	.00927	—.00592	.00506	
388, 740	55, 000	.01345	.00958	.01131	.00539					
388, 740	55, 000					—.00417	.00928	—.00619	.00512	
388, 740	55, 000	.01383	.00966	.01166	.00546					
388, 740	55, 000					—.00422	.00961	—.00627	.00538	
388, 740	55, 000	.01410	.00988							
	55, 000	.01431	.00021	.01214	.00587					After 4 minutes.
388, 740	55, 000					—.00452	.00979			
	55, 000					—.00437	.00015	—.00640	.00574	
388, 740	55, 000	.01445	.01008	.01233	.00593					
388, 740	55, 000					—.00455	.00990	—.00660	.00573	
388, 740	55, 000	.01478	.01023	.01268	.00603					

388,740	55,000	.01512	.01048	.01396	.00624	— .00164	.01014	— .00671	.00598		
384,740	55,000		.01048	.01396	.00624	— .00480	.01032	— .00684	.00611		
388,740	55,000	.01548	.01068	.01385	.00641	— .00493	.01053	— .00698	.00627		
384,740	55,000		.01078	.01353	.00655	— .00502	.01060	— .00709	.00644		
384,740	55,000	.01603	.01101	.01383	.00674	— .00001				After resting 16 hours.	
388,740	55,000			.01381	— .00001	— .00538	.01065	— .00740	.00643		
384,740	55,000	.01630	.01083	.01402	.00662	— .01353	.00998	.01345	.01017		
70,680	10,000					— .01290	.00073	.01357	.00728		
141,360	20,000					— .01197	.00093	.01304	.00838		
212,040	30,000										
70,680	10,000	.01347	.00150	.01309	.00005						
141,360	20,000	.01387	.00040	.01313	.00008						
212,040	30,000	.01472	.00015	.01320	.00008						
353,400	50,000	.01645	.00233	.01438	.00118						
70,680	10,000	.01478	— .00177								
141,360	20,000	.01513	+ .00035								
212,040	30,000	.01552	.00039								
282,720	40,000	.01590	.00038								
353,400	50,000	.01634	.00044								
282,720	40,000	.01598	— .00036								
212,040	30,000	.01560	— .00038								
141,360	20,000	.01523	— .00037								
70,680	10,000	.01484	— .00039	.01442	.00004						

No. 5085.

WROUGHT-IRON BAR, PREVIOUSLY STRAINED BY TENSION.

Form of specimens.



Maximum tensile stress of original test, 49.380 pounds per square inch. Specimen now threaded, stem dressed over and tested by alternate stresses.

Interval of rest between original and present tests, 9 years 7 months.

Sectional area, 6.246 square inches.

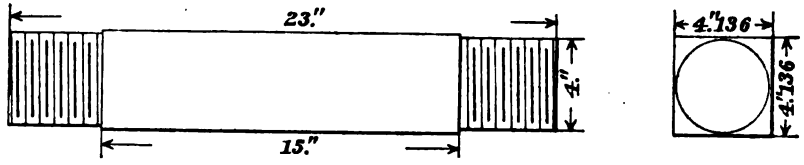
Gauged length, 10".

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	Initial load.
6,246	1,000	.00002	.00002							
31,230	5,000	.00013	.00011							
62,460	10,000	.00030	.00017	0.						
93,690	15,000	.00047	.00017	0.						
124,920	20,000	.00063	.00016	0.						
6,246	1,000					.00004	.00067	—.00001	—.00001	
31,230	5,000					.00019		0.	.00001	
62,460	10,000					.00036		0.	0.	
93,690	15,000					.00052		0.	0.	
124,920	20,000					.00068		0.	0.	
124,920	20,000	.00065	.00133	0.						
156,150	25,000	.00084	.00019	0.						
156,150	25,000					.00084	.00178	0.		

187,380	30,000	.00100	.00184	0.		.00104	.00204	.00008	.00008
187,380	30,000			—.00003	0.				
187,380	30,000	.00098	.00202	—.00003	0.				
218,610	35,000	.00115	.00017	—.00003	0.	.00129	.00244	.00013	.00009
218,610	35,000								
124,920	20,000	.00055	.00184	—.00010	.00002				
187,380	30,000	.00090	.00035	—.00010	0.				
218,610	35,000	.00109	.00019	—.00009	.00001				
224,856	36,000	.00111	.00002						
231,102	37,000	.00116	.00005						
237,348	38,000	.00119	.00003						
243,594	39,000	.00124	.00005						
249,840	40,000	.00127	.00003	—.00008	.00001	.00132	.00259		
218,610	35,000					.00151	.00019		
237,348	38,000					.00169	.00018	.00032	.00024
249,840	40,000								
124,920	20,000	.00034	.00203	—.00033	—.00001				
187,380	30,000	.00072	.00038	—.00030	.00003				
249,840	40,000	.00115	.00043	—.00024	.00006				
256,086	41,000	.00117	.00002						
262,332	42,000	.00120	.00003						
268,578	43,000	.00125	.00005						
274,824	44,000	.00130	.00005						
281,070	45,000	.00133	.00003	—.00021	.00003				
187,380	30,000	.00140	.00007						
293,562	47,000	.00143	.00003						
299,808	48,000	.00148	.00005						
306,054	49,000	.00152	.00004						
312,300	50,000	.00157	.00005	—.00013	.00008	.00096	.00248	.00017	.00004
124,920	20,000					.00128	.00012	.00026	.00009
187,380	30,000					.00172	.00044	.00042	.00016
249,840	40,000					.00210	.00038	.00085	.00043
281,070	45,000								
62,460	10,000	—.00052	.00188	—.00040	.00005				
124,920	20,000	—.00015	.00037	—.00078	.00002				
187,380	30,000	.00025	.00040	—.00080	—.00002				
249,840	40,000	.00075	.00050	—.00063	.00017				
312,300	50,000	.00141	.00066	—.00039	.00024				
312,300	50,000	.00140	—.00001	—.00037	.00002	.00072	.00212	.00040	.00003
62,460	10,000					.00113	.00041	.00014	.00004
124,920	20,000					.00178	.00065	.00056	.00013
187,380	30,000					.00211	.00033	.00075	.00019
249,840	40,000					.00245	.00034	.00092	.00017
281,070	45,000								
62,460	10,000	—.00038	.00187						
124,920	20,000	—.00017	.00041						
187,380	30,000	.00026	.00043						
249,840	40,000	.00074	.00048						
312,300	50,000	.00136	.00062	—.00041	.00051				

No. 5086.

Cast (gun) iron from Builders Iron Foundry. Marks 6a.



Sectional area, 17.1 square inch.
Gauged length, 10″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	Initial load.
17,100	1,000	.00004	.00004							
34,200	2,000	.00008	.00004							
51,300	3,000	.00014	.00006							
68,400	4,000	.00020	.00006							
85,500	5,000	.00025	.00005	0.						
17,100	1,000					.00003	.00028			
34,200	2,000					.00007	.00004			
51,300	3,000					.00012	.00005			
68,400	4,000					.00017	.00005			
85,500	5,000					.00022	.00005	.00001	.00001	
102,600	6,000	.00030	.00032							
119,700	7,000	.00035	.00005							
136,800	8,000	.00040	.00005							
153,900	9,000	.00046	.00006							
171,000	10,000	.00053	.00007	.00002	.00003					
17,100	1,000					.00002	.00055			
34,200	2,000					.00007	.00005			
51,300	3,000					.00011	.00004			
68,400	4,000					.00016	.00005			
85,500	5,000					.00020	.00004			

102,600	6,000					.00025	.00005				
119,700	7,000					.00030	.00005				
136,800	8,000					.00035	.00005				
153,900	9,000					.00040	.00005		.00002		.00004
171,000	10,000					.00046	.00006				
17,100	1,000	.00004	.00050								
34,200	2,000	.00010	.00006								
51,300	3,000	.00015	.00005								
85,500	5,000	.00025	.00010								
171,000	10,000	.00052	.00027								
188,100	11,000	.00057	.00045								
205,200	12,000	.00064	.00007	.00003	.00005	.00001	.00065				
17,100	1,000					.00005	.00004				
34,200	2,000					.00010	.00005				
85,500	5,000					.00045	.00035				
171,000	10,000					.00050	.00005				
188,100	11,000					.00055	.00005				
205,200	12,000					.00060	.00005				
222,300	13,000					.00067	.00007				
239,400	14,000					.00072	.00005		.00003		.00006
256,500	15,000										
17,100	1,000	.00001	.00073								
34,200	2,000	.00007	.00006								
85,500	5,000	.00025	.00018								
171,000	10,000	.00052	.00027	0.	.00003						

5086—Continued.

Micrometer now placed across the specimen transversely for the purpose of measuring the lateral contraction and expansion under tensile and compressive stresses respectively.

Gauged length, 4″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Contraction per inch.		Permanent set per inch.		Expansion per inch.		Permanent set per inch.		
Total.	Per square inch.	Total	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
85,500	5,000	.000075	.000075							
171,000	10,000	.000125	.000050	0.						
85,500	5,000					.000075	.000200			
171,000	10,000					.000125	.000050			
256,500	15,000					.000200	.000075	0.		
85,500	5,000	.000050	.000250							
171,000	10,000	.000100	.000050	0.						
85,500	5,000					.000100	.000200			
171,000	10,000					.000150	.000050			
256,500	15,000					.000200	.000050	.000025	.000025	
85,500	5,000					.000075	—.000125			
171,000	10,000					.000125	.000050			
256,500	15,000					.000200	.000075			
171,000	10,000					.000125	—.000075			
85,500	5,000					.000075	—.000050	.000025	0.	
85,500	5,000	.000050	.000125							
171,000	10,000	.000125	.000075							
85,500	5,000	.000050	—.000075							

Micrometer replaced on longitudinal gauged length of 10″, and observations renewed on direct tensile and compressive strains.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
85, 500	5, 000	.00025	.00025							
171, 000	10, 000	.00050	.00025	—.00002	—.00002					
85, 500	5, 000					.00023	.00073			
171, 000	10, 000					.00048	.00025			
256, 500	15, 000					.00073	.00025			
171, 000	10, 000					.00050	—.00023			
85, 500	5, 000					.00027	—.00023	.00003	.00003	
85, 000	5, 000					.00027	0.			
171, 000	10, 000					.00050	.00023			
256, 500	15, 000					.00073	.00023			
273, 600	16, 000					.00078	.00005			
307, 800	18, 000					.00090	.00012			
342, 000	20, 000					.00103	.00013			
256, 500	15, 000					.00079	—.00024			
171, 000	10, 000					.00056	—.00023			
85, 500	5, 000					.00032	—.00024	.00009	.00006	
17, 100	1, 000	—.00005	.00027							
34, 200	2, 000	+.00002	.00003							
51, 300	3, 000	.00007	.00005							
68, 400	4, 000	.00012	.00005							
85, 500	5, 000	.00018	.00006	—.00007	.00002					
102, 600	6, 000	.00024	.00006							
119, 700	7, 000	.00028	.00004							
136, 800	8, 000	.00034	.00006							
153, 900	9, 000	.00041	.00007							
171, 000	10, 000	.00047	.00006							
85, 500	5, 000	.00022	—.00025	—.00003	.00004					
17, 100	1, 000					.00007+	.00029			
34, 200	2, 000					.00012+	.00005			
51, 300	3, 000					.00017	.00005			
68, 400	4, 000					.00022	.00005			
85, 500	5, 000					.00027	.00005	.00004	.00001	
102, 600	6, 000					.00032	.00005			
119, 700	7, 000					.00036	.00004			

No. 5086—Continued.

Applied loads.		Under tensile strength.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
136, 800	8, 000	.....	.....	.....	.....	.00041	.00005	.....	.....	
153, 900	9, 000	.....	.....	.....	.....	.00047	.00006	.....	.....	
171, 000	10, 000	.....	.....	.....	.....	.00052	.00005	.00008	.00004	
188. 100	11, 000	.....	.....	.....	.....	.00057	.00005	.....	.....	
205, 200	12, 000	.....	.....	.....	.....	.00062	.00005	.....	.....	
222, 300	13, 000	.....	.....	.....	.....	.00067	.00005	.....	.....	
239. 400	14, 000	.....	.....	.....	.....	.00072	.00005	.....	.....	
256, 500	15. 000	.....	.....	.....	.....	.00077	.00005	.00010	.00002	
273, 600	16, 000	.....	.....	.....	.....	.00082	.00005	.....	.....	
307. 800	18, 000	.....	.....	.....	.....	.00093	.00011	.....	.....	
342, 000	20, 000	.....	.....	.....	.....	.00105	.00012	.00015	.00005	
342, 000	20, 000	.....	.....	.....	.....	.00107	.00002	.00013	—.00002	
342, 000	20, 000	.....	.....	.....	.....	.00107	0.	.00013	0.	
171, 000	10, 000	.00044	.00151	—.00006	.00007	.....	.....	.....	.....	
342, 000	20, 000	.....	.....	.....	.....	.00105	.00149	.00012	.00006	

Micrometer taken from longitudinal gauged length and placed across the specimen transversely in order to measure the lateral contraction or expansion of the metal when under tensile and compressive stresses.

Gauged length, 4″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Contraction per inch.		Permanent set per inch.		Expansion per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
85,500	5,000	.000050	.000050							
171,000	10,000	.000100	.000050	0.						
85,500	5,000					.000075	.000175			
171,000	10,000					.000125	.000050			
256,500	15,000					.000200	.000075			
342,000	20,000					.000250	.000050	.000025	.000025	
171,000	10,000	.000075	.000325	—.000025	0.					
342,000	20,000					.000250	.000325	0.	—.000025	

No. 5087.

Cast (gun) iron from Builders' Iron Foundry.
Marks 1_a.
Same form as No. 6.
Sectional area, $4''.190 \times 4''.190 = 17.56$ square inches.
Gauged length, $10''$.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	Initial load.
17,560	1,000					.00005	.00005			
35,120	2,000					.00009	.00004			
52,680	3,000					.00014	.00005			
70,240	4,000					.00019	.00005			
87,800	5,000					.00024	.00005	0.		
17,560	1,000	.00002	.00026							
35,120	2,000	.00007	.00005							
52,680	3,000	.00012	.00005							
70,240	4,000	.00017	.00005							
87,800	5,000	.00022	.00005	.00002	.00002					
87,800	5,000					.00022	.00044			
105,360	6,000					.00027	.00005			
122,920	7,000					.00032	.00005			
140,480	8,000					.00037	.00005			
158,040	9,000					.00043	.00006			
175,600	10,000					.00048	.00005	0.	.00002	
87,800	5,000	.00022	.00070							
105,360	6,000	.00027	.00005							
122,920	7,000	.00033	.00006							
140,480	8,000	.00038	.00005							
158,040	9,000	.00044	.00006							
175,600	10,000	.00050	.00006	.00003	.00003					
17,560	10,000					.00045	.00093			
193,160	11,000					.00051	.00006			
210,720	12,000					.00056	.00005			
228,280	13,000					.00062	.00006			
245,840	14,000					.00067	.00005			
263,400	15,000					.00073	.00006	.00003	.00006	
87,800	5,000	.00023	.00096							

105, 360	6, 000	.00028	.00005						
122, 920	7, 000	.00033	.00005						
140, 480	8, 000	.00038	.00005						
158, 040	9, 000	.00044	.00006						
175, 600	10, 000	.00049	.00005	.00004	.00007				
263, 400	15, 000					.00072	.00121		
280, 960	16, 000					.00077	.00005		
298, 520	17, 000					.00082	.00005		
316, 080	18, 000					.00087	.00005		
333, 640	19, 000					.00095	.00008		
351, 200	20, 000					.00100	.00005	.00005	.00009
87, 800	5, 000	.00022	.00122						
105, 360	6, 000	.00027	.00005						
122, 920	7, 000	.00032	.00005						
140, 480	8, 000	.00037	.00005						
158, 040	9, 000	.00042	.00005						
175, 600	10, 000	.00048	.00006	.00001	.00006				

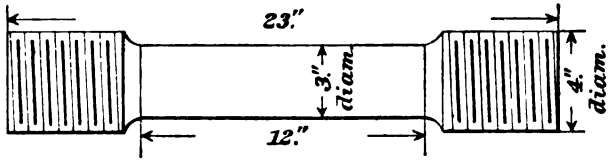
Micrometer now placed across the specimen transversely for the purpose of measuring the lateral contraction or expansion under tensile and compressive stresses.

Gauged length, 4″.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Contraction per inch.		Permanent set per inch.		Expansion per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	
87, 800	5, 000					.000050	.000050			
175, 600	10, 000					.000150	.000100			
263, 400	15, 000					.000175	.000025			
351, 200	20, 000					.000275	.000100	.000025	.000025	
87, 800	5, 000	.000050	.000325							
175, 600	10, 000	.000100	.000050	—.000025	0.					
87, 800	5, 000					.000075	.000175			
175, 600	10, 000					.000125	.000050			
263, 400	15, 000					.000200	.000075			
351, 200	20, 000					.000275	.000075	.000025	0.	
87, 800	5, 000	.000050	.000325							
175, 600	10, 000	.000100	.000050	—.000025	0.					

No. 5088.

Cast (gun) iron from Builders' Iron Foundry. Marks, 1b.



Sectional area, 7.068 square inches.
Gauged length, 10".

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	0.	0.	0.	0.	Initial load.
7,068	1,000	.00005	.00005							
14,136	2,000	.00009	.00004							
21,204	3,000	.00013	.00004							
28,272	4,000	.00016	.00003							
35,340	5,000	.00020	.00004	0.						
7,068	1,000					.00003	.00023			
14,136	2,000					.00007	.00004			
21,204	3,000					.00012	.00005			
28,272	4,000					.00015	.00003			
35,340	5,000					.00020	.00005	0.		
35,340	5,000	.00019	.00039							
42,408	6,000	.00023	.00004							
49,476	7,000	.00028	.00005							
56,544	8,000	.00033	.00005							
63,612	9,000	.00038	.00005							
70,680	10,000	.00045	.00007	.00003	.00003					
42,408	6,000					.00022	.00067			
49,476	7,000					.00028	.00006			
56,544	8,000					.00032	.00004			
70,680	10,000					.00044	.00012	0.	.00003	

70,680	10,000	.00045	.00089							
77,748	11,000	.00051	.00006							
84,816	12,000	.00057	.00006							
91,884	13,000	.00063	.00006							
98,952	14,000	.00070	.00007							
106,020	15,000	.00077	.00007	.00004	.00007					
70,680	10,000					.00040	.00117			
77,748	11,000					.00045	.00005			
84,816	12,000					.00049	.00004			
91,884	13,000					.00054	.00005			
98,952	14,000					.00059	.00005			
106,020	15,000					.00064	.00005	.00007	.00011	
106,020	15,000	.00078	.00142							
113,088	16,000	.00085	.00007							
120,156	17,000	.00092	.00007							
127,224	18,000	.00100	.00008							
134,292	19,000	.00108	.00008							
141,360	20,000	.00119	.00011	.00017	.00024					
7,068	1,000					−.00010	.00109			
14,136	2,000					−.00005	.00005			
28,272	4,000					0.	.00005			
42,408	6,000					.00007	.00007			
56,544	8,000					.00020	.00013			
70,680	10,000					.00030	.00010			
106,020	15,000					.00055	.00025			
113,088	16,000					.00063	.00008			
120,156	17,000					.00067	.00004			
127,224	18,000					.00077	.00010			
134,292	19,000					.00087	.00010			
141,360	20,000					.00087	0.			
134,292	19,000					.00083	−.00004			
127,224	18,000					.00078	−.00005			
120,156	17,000					.00074	−.00004			
113,088	16,000					.00073	−.00001			
106,020	15,000					.00070	−.00003			
98,952	14,000					.00067	−.00003			
91,884	13,000					.00062	−.00005			
84,816	12,000					.00055	−.00007			
77,748	11,000					.00052	−.00003			
70,680	10,000					.00047	−.00005			
63,612	9,000					.00042	−.00005			
56,544	8,000					.00040	−.00002			
49,476	7,000					.00036	−.00004			
42,408	6,000					.00031	−.00005			
35,340	5,000					.00025	−.00006			
28,272	4,000					.00025	0.			
21,204	3,000					.00021	−.00004			
14,136	2,000					.00016	−.00005			
7,068	1,000					.00013	−.00003	.00012	.00029	Test discontinued.

Holes defining gauged length drilled and countersunk. Micrometer readjusted and test assumed.

No. 5088—Continued.

Applied loads.		Under tensile strength.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0							.00012		
35,340	5,000	.00017	.00030	−.00008	.00004					
70,680	10,000	.00047	.00030	−.00003	.00005					
106,020	15,000	.00080	.00033	+.00002	.00005					
141,360	20,000	.00120	.00040	.00010	.00008					
35,340	5,000					.00013	.00133	−.00007	.00003	
70,680	10,000					.00043	.00033	−.00002	.00005	
106,020	15,000					.00069	.00026	+.00002	.00004	
141,360	20,000					.00099	.00030	.00008	.00006	
35,340	5,000	.00020	.00119	−.00005	.00003					
70,680	10,000	.00051	.00031	0.	.00005					
106,020	15,000	.00084	.00033	+.00005	.00005					
141,360	20,000	.00123	.00039	.00012	.00007					
148,428	21,000	.00133	.00010							
155,496	22,000	.00143	.00010							
162,564	23,000	.00161	.00018							
169,632	24,000	.00178	.00017							
176,700	25,000	.00198	.00020							
169,632	24,000	.00194	−.00004							
162,564	23,000	.00190	−.00004							
155,496	22,000	.00185	−.00005							
148,428	21,000	.00180	−.00005							
141,360	20,000	.00175	−.00005							
106,020	15,000	.00148	−.00027							
70,680	10,000	.00118	−.00030							
35,340	5,000	.00087	−.00031	.00055	.00043					
35,340	5,000	.00080	−.00007							
70,680	10,000	.00110	.00030							
106,020	15,000	.00138	.00028							
141,360	20,000	.00168	.00030							
106,020	15,000	.00142	−.00026							
70,680	10,000	.00114	−.00028							
35,340	5,000	.00085	−.00029	.00055	0.					
35,340	5,000					−.00024	.00061	−.00046	.00009	
70,680	10,000					+.00011	.00013	−.00033	.00013	
106,020	15,000					.00047	.00036	−.00022	.00011	
141,360	20,000					.00085	.00038	−.00010	.00012	
35,340	5,000	.00038	.00123	.00012	.00003					
70,680	10,000	.00071	.00033	.00018	.00005					

35,340	5,000				.00005	.00076	−.00017	.00001		
70,680	10,000				.00030	.00025	−.00010	.00007		
141,360	20,000				.00045	.00045				
148,428	21,000				.00061	.00066				
153,488	22,000				.00069	.00069				
162,564	23,000				.00100	.00066				
168,632	24,000				.00106	.00069				
176,700	25,000				.00115	.00069				
141,360	20,000				.00123	.00108				
104,520	15,000				.00100	−.00023				
70,680	10,000				.00078	−.00022				
35,340	5,000				.00053	−.00025				
35,340	5,000				.00030	−.00023				
70,680	10,000				.00027	+.00003				
106,020	15,000				.00050	−.00023				
141,360	20,000				.00073	−.00023				
105,020	15,000				.00098	−.00025				
70,680	10,000				.00075	−.00023				
35,340	5,000				.00052	−.00023				
35,340	5,000				.00029	−.00023	−.00007	.00001		
70,680	10,000									
106,020	15,000									
141,360	20,000									
105,020	15,000									
70,680	10,000									
35,340	5,000				.00028	.00177	−.00050	.00010		
70,680	10,000				−.00012	−.00040	−.00037	.00013		
106,020	15,000				+.00016	−.00048	−.00023	.00014		
141,360	20,000				.00062	−.00054	−.00012	.00011		
176,700	25,000				.00123	.00011	+.00005	.00017		
183,768	26,000				.00132	.00099				
190,836	27,000				.00140	.00098				
197,904	28,000				.00150	.00010				
204,972	29,000				.00162	.00013				
212,040	30,000				.00172	.00010	−.00028	.00023		
35,340	5,000	.00025	.00054	−.00001	.00006					
70,680	10,000	.00057	.00082	+.00005	.00000					
106,020	15,000	.00098	.00041	.00015	.00010					
141,360	20,000	.00141	.00073	.00030	.00015					
176,700	25,000	.00205	.00064	.00060	.00030					
35,340	5,000									
70,680	10,000									
106,020	15,000									
141,360	20,000									
176,700	25,000									
183,768	26,000									
190,836	27,000									
197,904	28,000									
204,972	29,000									
212,040	30,000									
35,340	5,000	.00023	.00152	−.00002	.00005					
70,680	10,000	.00058	.00135	+.00005	.00007					
106,020	15,000	.00085	.00037	.00015	.00010					
212,040	30,000					.00173		.00268		
219,108	31,000					.00184		.00011		
226,176	32,000					.00197		.00013		
233,244	33,000					.00211		.00014		
240,312	34,000					.00226		.00015		

No. 5088—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
247, 380	35, 000					.00251	.00025			
212, 040	30, 000					.00229	—.00022			
176, 700	25, 000					.00207	—.00022			
141, 360	20, 000					.00183	—.00024			
106, 020	15, 000					.00160	—.00023			
70, 680	10, 000					.00133	—.00027			
35, 340	5, 000					.00108	—.00025	.00078	.00093	
35, 340	5, 000	—.00042	.00066	—.00068	.00010					
70, 680	10, 000	—.00001	.00041	—.00053	.00015					
106, 020	15, 000	+.00052	.00053	—.00032	.00021					
141, 360	20, 000	.00116	.00064	+.00003	.00035					
176, 000	25, 000	.00202	.00086							
141, 360	20, 000	.00177	—.00025							
106, 020	15, 000	.00148	—.00029							
70, 680	10, 000	.00118	—.00030							
35, 340	5, 000	.00086	—.00032	.00053	.00050					
35, 340	5, 000					—.00022	.00064	—.00045	.00098	
70, 680	10, 000					+.00018	.00040	—.00030	.00015	
106, 020	15, 000					.00060	.00042	—.00015	.00015	
141, 360	20, 000					.00102	.00042	+.00003	.00018	
176, 700	25, 000					.00146	.00044	.00023	.00020	
212, 040	30, 000					.00194	.00048	.00046	.00023	
247, 380	35, 000					.00255	.00061	.00080	.00034	
254, 448	36, 000					.00275	.00020			
261, 516	37, 000					.00296	.00021			
268, 584	38, 000					.00325	.00029			
275, 652	39, 000					.00362	.00037			
282, 720	40, 000					.00400	.00038			
247, 380	35, 000					.00381	—.00019			
212, 040	30, 000					.00359	—.00022			
176, 700	25, 000					.00335	—.00024			
141, 360	20, 000					.00311	—.00024			
106, 020	15, 000					.00286	—.00025			
70, 680	10, 000					.00260	—.00026			
35, 340	5, 000					.00231	—.00029	.00200	.00120	
35, 340	5, 000	—.00160	.00071	—.00185	.00015					
70, 680	10, 000	—.00111	.00049	—.00163	.00022					
106, 020	15, 000	—.00050	.00061	—.00130	.00033					
141, 360	20, 000	+.00040	.00090	—.00074	.00056					

176, 700	25, 000	.00153	.00113						
141, 360	20, 000	.00131	—.00022						
106, 020	15, 000	.00102	—.00029						
70, 680	10, 000	.00072	—.00030						
35, 340	5, 000	.00040	—.00032	+.00008	.00082				
35, 340	5, 000					.00030	.00070	.00002	.00010
70, 680	10, 000					.00066	.00036	.00015	.00013
106, 020	15, 000					.00112	.00046	.00033	.00018
141, 360	20, 000					.00157	.00045	.00053	.00020
176, 700	25, 000					.00205	.00048	.00078	.00025
212, 040	30, 000					.00257	.000 2	.00105	.00027
247, 380	35, 000					.00321	.0004	.00143	.00038
282, 720	40, 000					.00410	.00089	.00205	.00062
289, 788	41, 000					.00437	.00027		
296, 856	42, 000					.00488	.00051		
303, 924	43, 000					.00527	.00039		
310, 992	44, 000					.00575	.00048		
318, 060	45, 000					.00634	.00059		
282, 720	40, 000					.00615	—.00019		
247, 380	35, 000					.00592	—.00023		
212, 040	30, 000					.00569	—.00023		
176, 700	25, 000					.00545	—.00024		
141, 360	20, 000					.00520	—.00025		
70, 680	10, 000					.00467	—.00053		
35, 340	5, 000					.00437	—.00030	.00401	.00196
35, 340	5, 000	—.00360	.00077	—.00383	.00019				
70, 680	10, 000	—.00305	.00055	—.00355	.00028				
106, 020	15, 000	—.00230	.00075	—.00311	.00044				
141, 360	20, 000	—.00123	.00107	—.00237	.00074				
176, 700	25, 000	+.00029	.00152						
141, 360	20, 000	.00002	—.00027						
106, 020	15, 000	—.00028	—.00030						
70, 680	10, 000	—.00058	—.00030						
35, 340	5, 000	—.00089	—.00031	—.00122	.00115				
35, 340	5, 000					.00156	.00067	.00127	.00005
70, 680	10, 000					.00196	.00040	.00141	.00014
106, 020	15, 000					.00241	.00045	.00159	.00018
141, 360	20, 000					.00289	.00048	.00182	.00023
176, 700	25, 000					.00339	.00050	.00205	.00023
212, 040	30, 000					.00390	.00051	.00233	.00028
247, 380	35, 000					.00452	.00062	.00272	.00039
282, 720	40, 000					.00526	.00074	.00320	.00048
318, 060	45, 000					.00638	.00112	.00403	.00083
325, 128	46 000					.00680	.00042		
332, 196	47, 000					.00723	.00043		
339, 264	48, 000					.00767	.00044		
346, 332	49, 000					.00851	.00084		
453, 400	50, 000					.00915	.00064		
318, 060	45, 000					.00895	—.00020		
28, 2720	40, 000					.00873	—.00022		
247, 380	35, 000					.00850	—.00023		
212, 040	30, 000					.00825	—.00025		

No. 5088—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
176, 700	25, 000					.00800	—.00025			
141, 360	20, 000					.00777	—.00023			
106, 020	15, 000					.00750	—.00027			
70, 680	10, 000					.00720	—.00030			
35, 340	5, 000					.00689	—.00031	.00650	.00247	
35, 340	5, 000	—.00605	.00084	—.00629	.00021					
70, 680	10, 000	—.00547	.00058	—.00598	.00031					
106 020	15. 000	—.00462	.00085	—.00542	.00056					
141, 360	20, 000	—.00342	.00120	—.00458	.00084					
176, 700	25, 000	—.00165	.00177							
141, 360	20, 000	—.00193	—.00028							
106, 020	15, 000	—.00222	—.00029							
70, 680	10, 000	—.00254	—.00032							
35, 340	5, 000	—.00285	—.00031	—.00317	.00141					
35, 340	5, 000					.00354	.00069	.00325	.00008	
70, 680	10, 000					.00394	.00040	.00338	.00013	
106, 020	15, 000					.00439	.00045	.00355	.00017	
141, 360	20, 000					.00485	.00046	.00375	.00020	
176, 700	25, 000					.00535	.00050	.00399	.00024	
212, 040	30, 000					.00586	.00051	.00425	.00026	
247, 380	35, 000					.00644	.00058	.00458	.00033	
282, 720	40, 000					.00709	.00065	.00500	.00042	
318, 060	45, 000					.00791	.00082	.00537	.00037	
353, 400	50 000					.00914	.00123			
318, 060	45, 000					.00893	—.00021			
282, 720	40, 000					.00870	—.00023			
247, 380	35, 000					.00847	—.00023			
212, 040	30, 000					.00823	—.00024			
176, 700	25, 000					.00799	—.00024			
141, 360	20, 000					.00775	—.00024			
106, 020	15, 000					.00747	—.00028			
70, 680	10, 000					.00720	—.00027			
35, 340	5, 000					.00689	—.00031	.00650	.00118	
35, 340	5. 000					.00678	—.00011			
70, 680	10, 000					.00700	+.00022			
106 020	15, 000					.00724	.00024			
141, 360	20 000					.00748	.00024			
176, 700	25, 000					.00772	.00024			
212, 040	30, 000					.00797	.00025			

247,380	35,000							.00824	.00627		
282,720	40,000							.00830	.00628		
318,060	45,000							.00840	.00630		
353,400	50,000							.00925	.00645		
318,060	45,000							.00905	.00620		
282,720	40,000							.00883	.00623		
247,380	35,000							.00860	.00623		
212,040	30,000							.00836	.00624		
176,700	25,000							.00812	.00624		
141,360	20,000							.00787	.00623		
106,020	15,000							.00760	.00617		
70,680	10,000							.00733	.00627		
35,340	5,000							.00703	.00630	.00668	.00018
70,680	10,000							.00692	.00611		
106,020	15,000							.00715	+.00623		
141,360	20,000							.00740	.00625		
176,700	25,000							.00763	.00623		
212,040	30,000							.00788	.00625		
247,380	35,000							.00813	.00625		
282,720	40,000							.00840	.00627		
318,060	45,000							.00867	.00627		
282,720	40,000							.00895	.00628		
247,380	35,000							.00873	.00622		
212,040	30,000							.00850	.00623		
176,700	25,000							.00828	.00622		
141,360	20,000							.00805	.00623		
106,020	15,000							.00780	.00625		
70,680	10,000							.00755	.00625		
35,340	5,000							.00730	.00623	.00669	.00001
70,680	10,000										
106,020	15,000										
141,360	20,000										
176,700	25,000										
141,360	20,000										
106,020	15,000										
70,680	10,000										
35,340	5,000										
70,680	10,000										
106,020	15,000										
141,360	20,000										
176,700	25,000										
141,360	20,000										
106,020	15,000										
70,680	10,000										
35,340	5,000										
70,680	10,000										
106,020	15,000										
141,360	20,000										

247,380	35,000							.00824	.00627		
282,720	40,000							.00830	.00628		
318,060	45,000							.00840	.00630		
353,400	50,000							.00925	.00645		
318,060	45,000							.00905	.00620		
282,720	40,000							.00883	.00623		
247,380	35,000							.00860	.00623		
212,040	30,000							.00836	.00624		
176,700	25,000							.00812	.00624		
141,360	20,000							.00787	.00623		
106,020	15,000							.00760	.00617		
70,680	10,000							.00733	.00627		
35,340	5,000							.00703	.00630	.00668	.00018
70,680	10,000							.00692	.00611		
106,020	15,000							.00715	+.00623		
141,360	20,000							.00740	.00625		
176,700	25,000							.00763	.00623		
212,040	30,000							.00788	.00625		
247,380	35,000							.00813	.00625		
282,720	40,000							.00840	.00627		
318,060	45,000							.00867	.00627		
282,720	40,000							.00895	.00628		
247,380	35,000							.00873	.00622		
212,040	30,000							.00850	.00623		
176,700	25,000							.00828	.00622		
141,360	20,000							.00805	.00623		
106,020	15,000							.00780	.00625		
70,680	10,000							.00755	.00625		
35,340	5,000							.00730	.00623	.00669	.00001
70,680	10,000										
106,020	15,000										
141,360	20,000										
176,700	25,000										
141,360	20,000										
106,020	15,000										
70,680	10,000										
35,340	5,000										
70,680	10,000										
106,020	15,000										
141,360	20,000										

247,380	35,000							.00824	.00627		
282,720	40,000							.00830	.00628		
318,060	45,000							.00840	.00630		
353,400	50,000							.00925	.00645		
318,060	45,000							.00905	.00620		
282,720	40,000							.00883	.00623		
247,380	35,000							.00860	.00623		
212,040	30,000							.00836	.00624		
176,700	25,000							.00812	.00624		
141,360	20,000							.00787	.00623		
106,020	15,000							.00760	.00617		
70,680	10,000							.00733	.00627		
35,340	5,000							.00703	.00630	.00668	.00018
70,680	10,000							.00692	.00611		
106,020	15,000							.00715	+.00623		
141,360	20,000							.00740	.00625		
176,700	25,000							.00763	.00623		
212,040	30,000							.00788	.00625		
247,380	35,000							.00813	.00625		
282,720	40,000							.00840	.00627		
318,060	45,000							.00867	.00627		
282,720	40,000							.00895	.00628		
247,380	35,000							.00873	.00622		
212,040	30,000							.00850	.00623		
176,700	25,000							.00828	.00622		
141,360	20,000							.00805	.00623		
106,020	15,000							.00780	.00625		
70,680	10,000							.00755	.00625		
35,340	5,000							.00730	.00623	.00669	.00001
70,680	10,000										
106,020	15,000										
141,360	20,000										

No. 5088—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
176, 700	25, 000					.00577	.00050			
212, 040	30, 000					.00627	.00050			
247, 380	35, 000					.00682	.00055			
282, 720	40, 000					.00742	.00060			
318, 060	45, 000					.00817	.00075			
353, 400	50, 000					.00912	.00095			
360, 468	51, 000					.00950	.00038			
367, 536	52, 000					.00980	.00030			
374, 604	53, 000					.01023	.00043			
381, 672	54, 000					.01103	.00080			
388, 740	55, 000					.01183	.00080			
353, 400	50, 000					.01170	—.00013			
318, 060	45, 000					.01148	—.00022			
282, 720	40, 000					.01125	—.00023			
247, 380	35, 000					.01101	—.00024			
212, 040	30, 000					.01077	—.00024			
176, 700	25, 000					.01051	—.00026			
141, 360	20, 000					.01025	—.00026			
106, 020	15, 000					.00998	—.00027			
70, 680	10, 000					.00968	—.00030			
35, 340	5, 000					.00935	—.00033	.00894	.00243	
35, 340	5, 000	—.00947	.00088	—.00870	.00024					
70, 680	10, 000	—.00788	.00059	—.00834	.00036					
106, 020	15, 000	—.00695	.00093	—.00778	.00056					
141, 360	20, 000	—.00570	.00125	—.00686	.00092					
176, 700	25, 000	—.00393	.00177							
141, 360	20, 000	—.00420	—.00027							
106, 020	15, 000	—.00450	—.00030							
70, 680	10, 000	—.00480	—.00030							
35, 340	5, 000	—.00511	—.00031	—.00544	.00142					
35, 340	5, 000					.00582	.00071	.00553	.00009	
70, 680	10, 000					.00622	.00040	.00564	.00011	
106, 020	15, 000					.00666	.00043	.00580	.00016	
141, 360	20 000					.00710	.00045	.00598	.00018	
176, 700	25, 000					.00757	.00047	.00619	.00021	
212, 040	30, 000					.00805	.00048	.00642	.00023	
247, 380	35, 000					.00857	.00052	.00670	.00028	
282, 720	40, 000					.00915	.00058	.00702	.00032	
318, 060	45, 000					.00983	.00068	.00746	.00044	

353, 400	50, 000				.01068	.00085	.00803	.00057			
388, 740	55, 000				.01183	.00117	.00890	.00087			
396, 808	56, 000				.01220	.00037					
402, 878	57, 000				.01256	.00036					
409, 944	58, 000				.01335	.00079					
417, 012	59, 000				.01407	.00072					
424, 080	60, 000				.01522	.00115					
388, 740	55, 000				.01512	.00010					
353, 400	50, 000				.01490	— .00022					
318, 060	45, 000				.01467	— .00023					
282, 720	40, 000				.01443	— .00024					
247, 380	35, 000				.01422	— .00021					
212, 040	30, 000				.01396	— .00026					
176, 700	25, 000				.01370	— .00026					
141, 360	20, 000				.01343	— .00027					
106, 020	15, 000				.01313	— .00030					
70, 680	10, 000				.01283	— .00030					
35, 340	5, 000				.01248	— .00035	.01204	.00314			
35, 340	5, 000			.00096	— .01152	.00029					
70, 680	10, 000			.00067	— .01085	.00040					
106, 020	15, 000			.00089	— .00996	.00058					
141, 360	20, 000			.00144	— .00852	.00107					
176, 700	25, 000			.00187	— .00665						
141, 360	20, 000			— .00027	— .00692						
106, 020	15, 000			— .00029	— .00721						
70, 680	10, 000			— .00030	— .00751						
35, 340	5, 000			— .00014	— .00765	— .00156					
35, 340	5, 000						.00824	.00059			
70, 680	10, 000						.00891	.00067			
106, 020	15, 000						.00933	.00042			
141, 360	20, 000						.00977	.00044			
176, 700	25, 000						.01025	.00048			
212, 040	30, 000						.01070	.00045			
247, 380	35, 000						.01120	.00050			
282, 720	40, 000						.01173	.00053			
318, 060	45, 000						.01235	.00062			
353, 400	50, 000						.01305	.00070			
388, 740	53, 000						.01400	.00095			
424, 080	60, 000						.01525	.00125			
	60, 000						.01535	.00010			
	60, 000						.01545	.00010			
	60, 000						.01552	.00007			
388, 740	55, 000						.01540	— .00012			
424, 080	60, 000						.01555	+ .00015			
388, 740	53, 000						.01542	— .00013			
424, 080	60, 000						.01557	+ .00015			
388, 740	55, 000						.01544	— .00013			
353, 400	50, 000						.01523	— .00021			
318, 060	45, 000						.01502	— .00021			
353, 400	50, 000						.01523	+ .00021			
318, 060	45, 000						.01500	— .00023			
353, 400	50, 000						.01523	+ .00023			

After 2 minutes.
After 4 minutes.
After 6 minutes.

No. 5088—Continued.

Applied loads.		Under tensile stress.				Under compressive stress.				Remarks.
		Elongation per inch.		Permanent set per inch.		Compression per inch.		Permanent set per inch.		
Total.	Per square inch.	Total.	Successive.	Total.	Successive.	Total.	Successive.	Total.	Successive.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
318,060	45,000					.01500	—.00023			
282,720	40,000					.01477	—.00023			
247,380	35,000					.01454	—.00023			
212,040	30,000					.01430	—.00024			
176,700	25,000					.01405	—.00025			
141,360	20,000					.01377	—.00028			
176,700	25,000					.01399	+.00022			
141,360	20,000					.01377	—.00022			
176,700	25,500					.01399	+.00022			
141,360	20,000					.01376	—.00023			
106,020	15,000					.01349	—.00027			
141,360	20,000					.01370	+.00021			
106,020	15,000					.01347	—.00023			
141,360	20,000					.01370	+.00023			
106,020	15,000					.01347	—.00023			
70,680	10,000					.01316	—.00031			
35,340	5,000					.01281	—.00035	.01240	.00136	
35,340	5,000					.01262	—.00019	.01236	—.00004	
35,340	5,000					.01262	0.	.01235	—.00001	Test discontinued.

SPECIMENS TAKEN FROM STEM OF OVERSTRAINED STEEL EYEBAR.

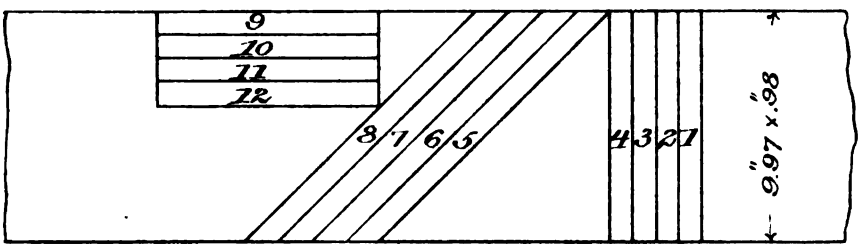
Interval between test of eyebar and test of the specimens, 3 years 3 months.

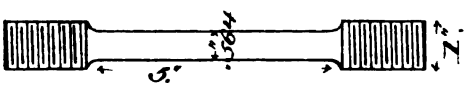
Original elastic limit 34,390 pounds per square inch. Maximum stress applied 54,350 pounds per square inch, which stretched the metal 5.5 per cent.

Odd numbers were finished and tested without annealing. Even numbers were anneal d.

The annealing was done by heating cherry red and cooling between pine boards.

Sketch showing location of specimens in stem of steel eye bar.





H Ex. 165 51 2

TENSION TESTS.

No. 2929.

Mark, 1.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.
Not annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0006	.....	
2,500	10,000	.0016	0.	
3,750	15,000	.0023	.....	
5,000	20,000	.0032	0.	
6,250	25,000	.0040	.....	
7,500	30,000	.0049	.0002	
8,750	35,000	.0058	.....	
10,000	40,000	.0069	.0005	
11,250	45,000	.0101	.0030	
11,500	46,000	.0114	.....	
11,750	47,000	.0129	.....	
12,000	48,000	.0158	.....	
12,250	49,000	.0180	.....	
12,500	50,000	.0223	.0138	
13,000	52,000	.0331	.....	
13,500	54,000	.0470	.....	
14,000	56,000	.0638	.....	
14,500	58,000	.0825	.....	
15,000	60,000	.1032	.....	
15,500	62,000	.16	.....	
16,000	64,000	.18	.....	
16,500	66,000	.27	.....	
16,580	66,320	.....	.....	Tensile strength.
0	0	.60	.....	= 12 per cent.

Elongation of inch sections, ″.08, ″.22,* ″.15, ″.09, ″.06.
Fractured 1″.95 from the neck. Appearance, silky serrated.
Diameter at fracture, ″.49. Area, .189 square inch.
Contraction, 24.6 per cent.

No. 2930.

Marks, 2.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.
Annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0005	.....	
2,500	10,000	.0015	0.	
3,750	15,000	.0023	.....	
5,000	20,000	.0032	.0001	
6,250	25,000	.0040	.....	
7,500	30,000	.0049	.0001	
8,750	35,000	.0056	.....	
10,000	40,000	.0066	.0001	Elastic limit.
10,250	41,000	.0113	.....	
10,500	42,000	.0995	.....	
10,750	43,000	.1031	.....	
11,000	44,000	.1140	.....	
11,250	45,000	.1210	.1131	
11,500	46,000	.1360	.....	
12,000	48,000	.17	.....	
12,500	50,000	.20	.....	
13,000	52,000	.22	.....	
13,500	54,000	.27	.....	
14,000	56,000	.31	.....	
14,500	58,000	.39	.....	
15,000	60,000	.48	.....	
15,500	62,000	.66	.....	
15,790	63,160	.96	.....	Tensile strength.
0	0	1.10	.....	=22 per cent.

Elongation of inch sections, ″.16, ″.20, ″.23, ″.28, ″.23*.
Fractured 1″.05 from the neck. Appearance, silky serrated. Opened cracks in surface of stem.
Diameter at fracture, ″.46. Area, .166 square inch.
Contraction, 33.5 per cent.

No. 2931.

Marks, 5.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.
Not annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0005	.....	
2,500	10,000	.0015	0.	
3,750	15,000	.0025	.....	
5,000	20,000	.0032	0.	
6,250	25,000	.0041	.....	
7,500	30,000	.0050	.0001	
8,750	35,000	.0058	.....	
10,000	40,000	.0069	.0002	
11,250	45,000	.0082	.0007	
11,500	46,000	.0089	.....	
11,750	47,000	.0091	.....	
12,000	48,000	.0098	.....	
12,250	49,000	.0103	.....	
12,500	50,000	.0116	.0028	
12,750	51,000	.0127	.....	
13,000	52,000	.0153	.....	
13,250	53,000	.0173	.....	
13,500	54,000	.0205	.....	
14,000	56,000	.0350	.....	
14,500	58,000	.0530	.....	
15,000	60,000	.0765	.0647	
15,500	62,000	.10	.....	
16,000	64,000	.14	.....	
16,500	66,000	.21	.....	
16,690	66,760	.35	.....	Tensile strength.
0	0	.80	.....	=16. per cent.

Elongation of inch sections, ″.09, ″.45*, ″.15, ″.07, ″.04.
Fractured 1″.70 from the neck. Appearance, fine silky.
Diameter at fracture, ″.36. Area, .102 square inch.
Contraction, 59.3 per cent.

No. 2932.

Marks, 6.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.
Annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0005	.....	
2,500	10,000	.0013	0.	
3,750	15,000	.0022	.....	
5,000	20,000	.0031	0.	
6,250	25,000	.0039	.....	
7,500	30,000	.0048	0.	
8,750	35,000	.0057	.....	
10,000	40,000	.0067	.0001	
10,500	42,000	.....	.....	Elastic limit. Sustained momentarily, then yielded rapidly under reduced load.
10,000	40,000	.0938	.....	
10,250	41,000	.0947	.....	
10,500	42,000	.0978	.....	
10,750	43,000	.1017	.....	
11,000	44,000	.1150	.....	
11,250	45,000	.1278	.1188	
11,500	46,000	.135	.....	
12,000	48,000	.18	.....	
12,500	50,000	.20	.....	
13,000	52,000	.22	.....	
13,500	54,000	.27	.....	
14,000	56,000	.32	.....	
14,000	58,000	.40	.....	
15,000	60,000	.50	.....	
15,500	62,000	.70	.....	
15,710	62,840	1.05	.....	Tensile strength.
0	0	1.38	.....	=27.5 per cent.

Elongation of inch sections, ″.17, ″.22, ″.54,* ″.24, ″.21.
Fractured, 3″ from the neck. Appearance, fine silky.
Diameter at fracture, ″.35. Area, .096 square inch.
Contraction, 61.5 per cent.

No. 2933.

Marks, 9.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 5″.
Not annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0004	.....	
2,500	10,000	.0013	0.	
3,750	15,000	.0022	.....	
5,000	20,000	.0030	0.	
6,250	25,000	.0039	.....	
7,500	30,000	.0048	0.	
8,750	35,000	.0056	.....	
10,000	40,000	.0065	0.	
11,250	45,000	.0073	.....	
12,500	50,000	.0083	.0001	
12,750	51,000	.0084	.....	
13,000	52,000	.0086	.....	
13,250	53,000	.0088	.....	
13,500	54,000	.0090	.....	
13,750	55,000	.0092	.0001	
14,000	56,000	.0094	.....	
14,250	57,000	.0095	.....	
14,500	58,000	.0099	.....	
14,750	59,000	.0101	.....	
15,000	60,000	.0103	.0003	
15,250	61,000	.0105	.....	
15,500	62,000	.0109	.....	
15,750	63,000	.0113	.....	
16,000	64,000	.0119	.....	
16,250	65,000	.0124	.0013	
16,500	66,000	.0329	.....	
16,750	67,000	.0687	.....	
17,000	68,000	.1038	.0893	
.....	5,000	.0898	.....	
.....	10,000	.0908	.....	
.....	15,000	.0918	.....	
.....	20,000	.0928	.....	
.....	25,000	.0938	.....	
.....	30,000	.0948	.....	
.....	35,000	.0958	.....	
.....	40,000	.0968	.....	
.....	45,000	.0979	.....	
.....	50,000	.0990	.....	
.....	45,000	.0982	.....	
.....	40,000	.0972	.....	
.....	35,000	.0962	.....	
.....	30,000	.0953	.....	
.....	25,000	.0942	.....	
.....	20,000	.0932	.....	
.....	15,000	.0922	.....	
.....	10,000	.0912	.....	
.....	5,000	.0902	.0892	
17,250	69,000	.1117	.....	
17,500	70,000	.1697	.....	
17,750	71,000	.20	.....	
18,000	72,000	.29	.....	
18,360	73,440	.52	.....	Tensile strength.
0	0	.90	.....	=18 per cent.

Elongation of inch sections, ″.07, ″.10, ″.13, ″.43*, ″.17.
Fractured 1″.60 from the neck. Appearance, fine silky.
Diameter at fracture, ″.35. Area, .096 square inch.
Contraction, 61.5. per cent.

No. 2934.

Marks, 10.
Diameter, ″.564
Sectional area, .25 square inch.
Gauged length, 5′.
Annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0004	.....	
2,500	10,000	.0013	0.	
3,750	15,000	.0022	.....	
5,000	20,000	.0032	0.	
6,250	25,000	.0040	.....	
7,500	30,000	.0049	0.	
8,750	35,000	.0057	0.	
10,000	40,000	.0067	0.	
11,250	45,000	.0073	0.	
11,500	46,000	.0077	.....	
11,750	47,000	.....	.....	Elastic limit. Sustained load momentarily, then yielded rapidly and load fell.
10,250	41,000	.0258	.....	
10,500	42,000	.0525	.....	
10,750	43,000	.1295	.....	
11,000	44,000	.1892	.....	
11,250	45,000	.1447	.....	
11,500	46,000	.1548	.....	
12,000	48,000	.1840	.....	
12,500	50,000	.22	.....	
13,000	52,000	.26	.....	
13,500	54,000	.30	.....	
14,000	56,000	.35	.....	
14,500	58,000	.41	.....	
15,000	60,000	.50	.....	
15,500	62,000	.62	.....	
16,000	64,000	.90	.....	Tensile strength.
0	0	1.30	.....	=26 per cent.

Elongation of inch sections, ″.18, ″.36, ″.40*, ″.19, ″.17.
Fractured 3″.70 from the neck. Appearance, fine silky.
Diameter at fracture, ″.35. Area, .096 square inch.
Contraction, 61.5 per cent.

COMPRESSION TESTS.

No. 2935.

CROSSWISE SPECIMEN.

Marks, 3.
Length, 9″.
Diameter, ″.926.
Sectional area, .673 square inch.
Gauged length, 5″.
Not annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
673	1,000	0.	0.	Initial load.
3,365	5,000	.0006	.....	
6,730	10,000	.0012	0.	
10,095	15,000	.0021	.....	
13,460	20,000	.0027	0.	
16,825	25,000	.0036	.....	
20,190	30,000	.0043	0.	
23,555	35,000	.0051	.....	
26,920	40,000	.0062	.0001	
27,593	41,000	.0065	.....	
28,266	42,000	.0066	.....	
28,939	43,000	.0069	.....	
29,612	44,000	.0071	.....	
30,285	45,000	.0074	.0005	
30,958	46,000	.0075	.....	
31,631	47,000	.0077	.....	
32,304	48,000	.0080	.....	
32,977	49,000	.0085	.....	
33,650	50,000	.0090	.0011	
34,323	51,000	.0093	.....	
34,996	52,000	.0101	.....	
35,669	53,000	.0113	.....	
36,342	54,000	.0124	.....	
37,015	55,000	.0146	.0054	
37,688	56,000	.0176	.....	
38,361	57,000	.0228	.....	
39,034	58,000	.0620	.0503	
39,100	58,100	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 2936.

CROSSWISE SPECIMEN.

Marks, 4.
Length, 9″.
Diameter, ″.942.
Sectional area, .697 square inch.
Gauged length, 5″.
Annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
697	1,000	0.	0.	Initial load.
3,485	5,000	.0006	.....	
6,970	10,000	.0013	0.	
10,455	15,000	.0022	.....	
13,940	20,000	.0029	0.	
17,425	25,000	.0037	.....	
20,910	30,000	.0045	0.	
24,395	35,000	.0053	.....	
27,880	40,000	.0060	0.	
28,577	41,000	.0062	.....	
29,274	42,000	.0065	.....	
29,971	43,000	.....	.....	Ultimate strength and elastic limit.

Failed by triple flexure.

No. 2937.

DIAGONAL SPECIMEN.

Marks, 7.
Length, 9″.
Diameter, ″.926.
Sectional area, .673 square inch.
Gauged length, 5″.
Not annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
673	1,000	0.	0.	Initial load.
3,365	5,000	.0006	.....	
6,730	10,000	.0013	0.	
10,095	15,000	.0021	.....	
13,460	20,000	.0028	0.	
16,825	25,000	.0035	.....	
20,190	30,000	.0043	0.	
23,555	35,000	.0051	.....	
26,920	40,000	.0061	0.	
27,593	41,000	.0065	.....	
28,266	42,000	.0068	.....	
28,939	43,000	.0071	.....	
29,612	44,000	.0075	.....	
30,285	45,000	.0081	.0011	
30,958	46,000	.0088	.....	
31,631	47,000	.0095	.....	
32,304	48,000	.0107	.....	
32,977	49,000	.0121	.....	
33,650	50,000	.0135	.0055	
34,323	51,000	.0146	.....	
34,996	52,000	.0150	.....	Specimen deflects upward.
35,669	53,000	.0143	.....	
36,342	54,000	.0225	.....	
36,600	54,380	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 2938.

DIAGONAL SPECIMEN.

Marks, 8.
Length, 9″.
Diameter, ″.935.
Sectional area, .687 square inch.
Gauged length, 5″.
Annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
687	1,000	0.	0.	Initial load.
3,435	5,000	.0008	.....	
6,870	10,000	.0015	0.	
10,305	15,000	.0023	.....	
13,740	20,000	.0031	.0001	
17,175	25,000	.0038	.....	
20,610	30,000	.0047	.0001	
24,045	35,000	.0055	.....	
27,480	40,000	.0063	.0002	
28,167	41,000	.0066	.....	
28,854	42,000	.0070	.....	
29,541	43,000	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 2939.

LENGTHWISE SPECIMEN.

Marks, 11.
Length, 9″.
Diameter, ″.915.
Sectional area, .658 square inch.
Gauged length, 5″.
Not annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
658	1,000	0.	0.	Initial load.
3,290	5,000	.0005	.....	
6,580	10,000	.0013	0.	
9,870	15,000	.0020	.....	
13,160	20,000	.0028	.0002	
16,450	25,000	.0035	.....	
19,740	30,000	.0043	.0004	
23,030	35,000	.0053	.....	
26,320	40,000	.0112	.0052	
26,978	41,000	.0130	.....	
27,636	42,000	.0155	.....	
28,294	43,000	.0180	.....	
28,952	44,000	.0189	.....	
29,610	45,000	.0190	.0125	
32,200	48,940	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 2940.

LENGTHWISE SPECIMEN.

Marks, 12.
Length, 9″.
Diameter, ″.933.
Sectional area, .684 square inch.
Gauged length, 5″.
Annealed.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
684	1,000	0.	0.	Initial load.
3,420	5,000	.0006	.....	
6,840	10,000	.0014	.....	
10,260	15,000	.0021	.....	
13,680	20,000	.0029	.....	
17,100	25,000	.0037	.....	
20,520	30,000	.0045	.....	
23,940	35,000	.0054	.....	
27,360	40,000	.0063	.....	
28,044	41,000	.0065	.....	
28,728	42,000	.0067	.....	Elastic limit.
29,412	43,000	.1068	.....	
30,780	45,000	.....	.....	Ultimate strength.

Failed by triple flexure.

TABULATION OF SPECIMENS TAKEN FROM OVERSTRAINED STEEL EYEBAR.

TENSION SPECIMENS.

No. of test.	Marks.	How taken.	Condition.	Diameter.	Sectional area.	Elastic limit per square inch.	Ultimate strength per square inch.	Elongation in 5 inches.	Area of fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
				Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*" Sq. in.*	*Per ct.*		" " " " "
2929	1	Crosswise.....	Not annealed.	.564	.25	.....	66,320	12.0	Diam., .49=.189	24.6	Silky serrated.....	.08, .22*, .15, .09, .06
2930	2	...do.....	Annealed.....	.564	.25	40,000	63,160	22.0	Diam., .46=.166	33.5	...do.....	.16, .20, .23, .28, .23*
2931	5	Diagonally....	Not annealed.	.564	.25	.....	66,760	16.0	Diam., .36=.102	59.3	Fine silky.....	.09, .45*, .15, .07, .04
2932	6	....do.....	Annealed.....	.564	.25	42,000	62,840	27.5	Diam., .35=.096	61.5	....do.....	.17, .22, .54*, .24, .21
2933	9	Lengthwise...	Not annealed.	.564	.25	.....	73,440	18.0	Diam., .35=.096	61.5	...do.....	.07, .10, .13, .43*, .17
2934	10	....do.....	Annealed.....	.564	.25	47,000	64,000	26.0	Diam., .35=.096	61.5	....do.....	.18, .36, .40*, .19, .17

COMPRESSION SPECIMENS.

2935	3	Crosswise.....	Not annealed.	.926	.673	.....	58,100	.....	.....	.....	.....	.....
2936	4	...do.....	Annealed.....	.942	.697	43,000	43,000	.....	.....	.....	.....	.....
2937	7	Diagonally....	Not annealed.	.926	.673	.....	54,380	.....	.....	.....	.....	.....
2938	8	...do.....	Annealed.....	.935	.687	.....	43,000	.....	.....	.....	.....	.....
2939	11	Lengthwise...	Not annealed.	.915	.658	.....	48,940	.....	.....	.....	.....	.....
2940	12	....do.....	Annealed.....	.933	.684	42,000	45,000	.....	.....	.....	.....	.....

The compression specimens failed by triple flexure.

INITIAL STRAINS IN STEEL

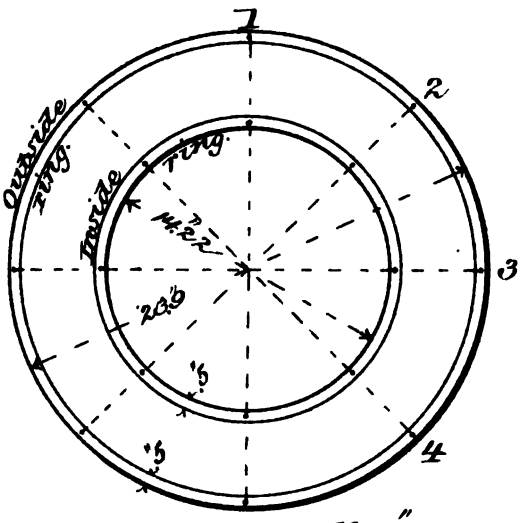
FROM

8-INCH AND 12-INCH B. L. RIFLES.

Slices from 8-inch jacket and tube forgings. Also slice from 12-inch hoop, A_1.

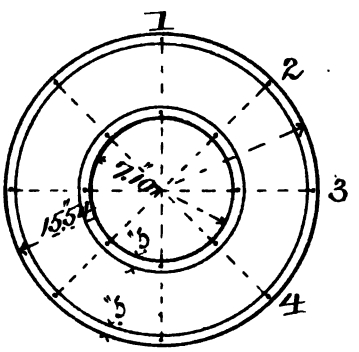
8 inch B.L. Rifle Steel.

Slice from Jacket.



Mean length 1.16

Slice from Tube.



Length 1.08

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No. 4345.

MEASUREMENT OF RINGS FROM SLICE TAKEN FROM BREECH END OF JACKET, 8-INCH B. L. RIFLE.

OUTSIDE RING.

Ring.	Diameters.				
	1	2	3	4	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
In slice	23.4229	23.4402	23.4293	23.4137	23.4290
Detached	23.4212	23.4473	23.4456	23.4112	23.4313
Differences	—.0017	+.0071	+.0063	—.0025	+.0023

INSIDE RING.

In slice	14.7637	14.7437	14.7625	14.7501	14.7550
Detached	14.7650	14.7443	14.7630	14.7520	14.7561
Differences	+.0013	+.0006	+.0005	+.0019	+.0011

Stresses corresponding to above mean strains.
Outside ring, 2,950 pounds per square inch compression.
Inside ring, 2,240 pounds per square inch compression.

No. 4345.

MEASUREMENT OF RINGS FROM SLICE TAKEN FROM BREECH END OF JACKET, 8-INCH B. L. RIFLE.

OUTSIDE RING.

Ring.	Diameters.				
	1	2	3	4	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
In slice	23.4229	23.4402	23.4393	23.4137	23.4290
Detached	23.4212	23.4473	23.4456	23.4112	23.4313
Differences	—.0017	+.0071	+.0063	—.0025	+.0023

INSIDE RING.

In slice	14.7637	14.7437	14.7625	14.7501	14.7550
Detached	14.7650	14.7443	14.7630	14.7520	14.7561
Differences	+.0013	+.0006	+.0005	+.0019	+.0011

Stresses corresponding to above mean strains.
Outside ring, 2,950 pounds per square inch compression.
Inside ring, 2,240 pounds per square inch compression.

No. 4346.

MEASUREMENT OF RINGS FROM SLICE TAKEN FROM TUBE, 8-INCH B. L. RIFLE.

OUTSIDE RING.

Ring.	Diameters.				
	1	2	3	4	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
In slice	15.0339	15.0343	15.0106	15.0198	15.0246
Detached	15.0391	15.0347	15.0090	15.0205	15.0258
Differences	+.0052	+.0004	—.0016	+.0007	+.0012

INSIDE RING.

In slice	7.6173	7.6194	7.6234	7.6189	7.61975
Detached	7.6179	7.6193	7.6238	7.6190	7.62000
Differences	+.0006	—.0001	+.0004	+.0001	+.00025

Stresses corresponding to above mean strains.
Outside ring, 2,400 pounds per square inch compression.
Inside ring, 9,840 pounds per square inch compression.

SLICE FROM HOOK A_1, 12-INCH B. L. RIFLE, STEEL.

The original diameters were: Inside, 33″.40; outside, 43″.75.
The slice was turned down to the given diameters on sketch before the measurements were taken for initial strains.

OUTSIDE RING.

Ring.	Diameters.				
	1	2	3	4	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
In slice	42.8925	42.8920	42.9020	42.8990	42.8964
Detached	42.8942	42.8899	42.9491	42.9417	42.9187
Differences	+.0017	—.0021	+.0471	+.0427	+.0223

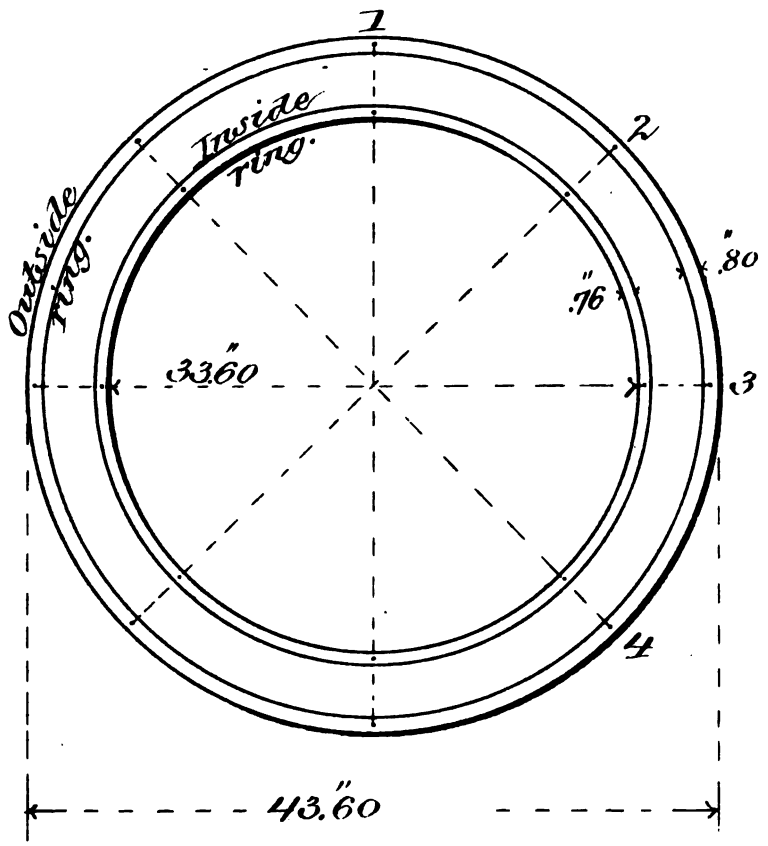
INSIDE RING.

In slice	34.3167	34.3255	34.3236	34.3157	34.3204
Detached	34.3606	34.3600	34.3407	34.3397	34.3503
Differences	+.0439	+.0345	+.0171	+.0240	+.0299

The gauged diameters for determining the initial strains were established on the inside face of the slice.
Stresses corresponding to above mean strains.
Outside ring, 15,600 pounds per square inch compression.
Inside ring, 26,140 pounds per square inch compression.

12-inch B.L. Rifle Steel.

Slice from hoop A 1.



Length ranges from 1.44" to 1.76"

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CAST IRON FROM WATERTOWN ARSENAL FOUNDRY.

Specimens 1″.129 diameter were tested in the grooved form.

No. of test.	Marks or description.	Diameter.	Sectional area.	Tensile strength. Total.	Tensile strength. Per square inch.
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*
2957	From same 8″.2 shell	.505	.20	7,010	35,050
2958		.505	.20	7,020	35,100
2959		.505	.20	6,989	34,900
2989	Pig of remelted Dyer projectiles	1.129	1.00	16,980	16,980
2990		1.129	1.00	26,670	26,670
2991	Pig of remelted 8 and 9 inch Butler projectiles	Top of pig.		27,480	27,480
2992		Bottom of pig.		25,170	25,170
	Specimens cast from same crucible of metal; those marked F. were cast with silica or Al. flux; those marked O. cast without flux.				
2993	O. From same crucible	1.129	1.00	27,820	27,820
2994	O.	1.129	1.00	25,410	25,410
2995	F.	1.129	1.00	24,080	24,080
2996	F.	1.129	1.00	23,040	23,040
2999	F.	1.129	1.00	29,500	29,500
3000	F. From same crucible	1.129	1.00	29,060	29,060
3001	O.	1.129	1.00	29,050	29,050
3002	O.	1.129	1.00	28,980	28,980
2997	S. C. 8″, C. S	1.129	1.00	16,310	16,310
2998	S. C. 8″, C. S_2	1.129	1.00	27,620	27,620
3203	8″, C. S_1	1.129	1.00	18,980	18,980
3204	8″ C. S_2	1.129	1.00	26,190	26,190
3205	8″, C. S_3	1.129	1.00	25,810	25,810
3206	$\frac{1}{8}$	1.129	1.00	26,800	26,800
3207	$\frac{1}{8}$	1.129	1.00	28,550	28,550
3208	C. S. $\frac{1}{8}$	1.129	1.00	31,470	31,470
3209	C. S. $\frac{1}{8}$	1.129	1.00	31,090	31,090
3210	C. S. $\frac{1}{8}$	1.129	1.00	30,950	30,950
3211	C. S. $\frac{1}{8}$	1.129	1.00	31,600	31,600
3212	S. C. W. I. C $\frac{1}{8}$	1.129	1.00	30,600	30,600
3213	S. C. W. I. C $\frac{1}{8}$	1.129	1.00	29,450	29,450
3214	S. C. S. W. I. C. $\frac{1}{8}$	1.129	1.00	30,580	30,580
3215	S. C. S. W. I. C. $\frac{1}{8}$	1.129	1.00	30,990	30,990
3216	C. S. $\frac{1}{8}$	1.129	1.00	31,400	31,400
3217	C. S. $\frac{1}{8}$	1.129	1.00	31,480	31,480
3218	$\frac{1}{4}$ W. I. 20	1.129	1.00	28,980	28,980
3219	$\frac{1}{4}$ W. I. 20	1.129	1.00	30,010	30,010
3220	S. C. $\frac{1}{4}$	1.129	1.00	29,820	29,820
3221	S. C. $\frac{1}{4}$	1.129	1.00	29,700	29,700
3222	S. C. $\frac{1}{4}$	1.129	1.00	30,200	30,200
3223	S. C. $\frac{1}{4}$	1.129	1.00	30,410	30,410
3224	S. C. $\frac{1}{4}$	1.129	1.00	30,180	30,180
3225	S. C. $\frac{1}{4}$	1.05	.86	26,610	30,940
3226	S. C. $\frac{1}{4}$	1.129	1.00	29,040	29,040
3227	S. C. $\frac{1}{4}$	1.129	1.00	29,650	29,650
3228	S. C. $\frac{1}{4}$	1.129	1.00	28,630	28,630
3229	S. C. $\frac{1}{4}$	1.129	1.00	28,460	28,460
3230	S. C. $\frac{1}{4}$	1.129	1.00	30,650	30,650
3231	S. C. $\frac{1}{4}$	1.129	1.00	30,080	30,080
3238	S. C. $\frac{1}{4}$	1.129	1.00	31,620	31,620
3239	S. C. $\frac{1}{4}$	1.129	1.00	31,280	31,280
4301	S. C. $\frac{1}{4}$	1.129	1.00	30,880	30,880
4302	S. C. $\frac{1}{4}$	1.129	1.00	30,140	30,140
4303	S. C. $\frac{1}{4}$	1.129	1.00	30,030	30,030
4304	S. C. $\frac{1}{4}$	1.129	1.00	29,980	29,980
4305	S. C. $\frac{1}{4}$	1.129	1.00	26,800	26,800
4306	S. C. $\frac{1}{4}$	1.129	1.00	29,180	29,180
4307	S. C. $\frac{1}{4}$	1.129	1.00	30,690	30,690
4308	S. C. $\frac{1}{4}$	1.129	1.00	30,660	30,660
4309	$\frac{1}{4}$	1.129	1.00	29,890	29,890
4310	$\frac{1}{4}$	1.120	1.00	29,410	29,410
4311	S. C. $\frac{1}{4}$	1.129	1.00	29,340	29,340
4312	S. C. $\frac{1}{4}$	1.129	1.00	29,090	29,090
4313	S. C $\frac{1}{4}$	1.129	1.00	28,570	28,570
4314	S. C $\frac{1}{4}$	1.129	1.00	28,030	28,030
4315	$\frac{1}{4}$	1.129	1.00	29,480	29,480
4316	$\frac{1}{4}$	1.129	1.00	29,400	29,400
4317	$\frac{1}{4}$	1.129	1.00	30,210	30,210
4318	$\frac{1}{4}$	1.129	1.00	30,470	30,470
4319	S. C. $\frac{1}{4}$	1.129	1.00	29,420	29,420
4320	S. C. $\frac{1}{4}$	1.129	1.00	27,980	27,980
4321	$\frac{1}{4}$	1.129	1.00	25,800	25,800
4322	$\frac{1}{4}$	1.129	1.00	25,920	25,920
4323	$\frac{1}{4}$	1.129	1.00	25,240	25,240
4324	$\frac{1}{4}$	1.129	1.00	26,980	26,980
4325	S. C. $\frac{1}{4}$	1.129	1.00	22,270	22,270
4326	S. C. $\frac{1}{4}$	1.129	1.00	22,790	22,790

TWO SPECIMENS OF CAST IRON FROM WATERTOWN ARSENAL FOUNDRY. ONE SPECIMEN CAST WITHOUT FLUX AND ONE WITH ALUMINUM FLUX.

No. 812.

SPECIMEN WITHOUT FLUX.

Length, 3″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	Initial load.
2,500	5,000	.0005	—.0001	
5,000	10,000	.0022	.0007	
7,500	15,000	.0033	.0008	
10,000	20,000	.0045	.0010	
12,500	25,000	.0056	.0013	
15,000	30,000	.0072	.0018	
17,500	35,000	.0090	.0027	
20,000	40,000	.0115	.0040	
22,500	45,000	.0153	.0068	
25,000	50,000	.0202	.0105	
27,500	55,000	.0270	.0162	
30,000	60,000	.0352	.0228	
44,810	89,620	.....	.....	Ultimate strength.

Failed by triple flexure.

No. 813.

SPECIMEN WITH ALUMINUM FLUX.

Length, 5″.
Diameter, ″.798.
Sectional area, .50 square inch.
Gauged length, 3″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
500	1,000	0.	0.	Initial load.
2,500	5,000	.0006	0.	
5,000	10,000	.0016	.0002	
7,500	15,000	.0027	.0002	
10,000	20,000	.0038	.0004	
12,500	25,000	.0050	.0006	
15,000	30,000	.0064	.0010	
17,500	35,000	.0080	.0016	
20,000	40,000	.0107	.0030	
22,500	45,000	.0140	.0053	
25,000	50,000	.0195	.0097	
27,500	55,000	.0265	.0154	
30,000	60,000	.0354	.0235	
43,100	86,200	.....	.....	Ultimate strength.

Failed by triple flexure.

CAST IRON FROM WATERVLIET ARSENAL.

No. of test.	Mark.	Diameter.	Sectional area.	Tensile strength.		Fracture.
				Total.	Per square inch.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	
3396	11	.505	.20	4,340	21,700	Medium, coarse, granular.
3397	12	.564	.25	8,370	33,480	Fine granular.
3232	.....	.505	.20	5,610	28,050	Granular.
3233	.....	.505	.20	6,090	30,450	Do.
3234	.....	.505	.20	6,130	30,650	Do.
3235	.....	.505	.20	5,980	29,900	Do.
3236	.....	.505	.20	6,100	30,500	Do.
3237	.....	.505	.20	6,130	30,650	Do.

TENSILE TESTS OF PIG IRONS.

Specimens 1″.129 diameter were tested in the grooved form.

No. of test.	Description.	Diameter.	Sectional area.	Tensile strength.	
				Total.	Per square inch.
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*
2960	Muirkirk pig, From same pig	1.129	1.00	32,890	32,890
2961	....do, From same pig	1.129	1.00	31,480	31,480
2966	....do, From same pig	1.129	1.00	23,580	23,580
2967	....do, From same pig	1.129	1.00	24,190	24,190
2985	....do, From same pig	.798	.50	12,570	25,140
2986	....do, From same pig	.798	.50	12,250	24,500
2976	Muirkirk pig, pile 1	1.129	1.00	38,310	38,310
2977	....do	1.129	1.00	34,320	34,320
2987	....do	.798	.50	15,910	31,820
2978	Muirkirk pig, pile 2	1.129	1.00	22,300	22,300
2979	Muirkirk pig, pile 3	1.129	1.00	30,990	30,990
2980	....do	1.129	1.00	29,370	29,370
2988	....do	.798	.50	14,620	29,240
2981	Muirkirk pig, pile 4	1.129	1.00	36,870	36,870
2982	....do	1.129	1.00	35,900	35,900
2962	Shelby pig, From same pig	1.129	1.00	16,610	16,610
2963	....do, From same pig	1.129	1.00	15,720	15,720
2968	Katahdin pig	1.129	1.00	24,510	24,510
2969	....do	1.129	1.00	28,440	28,440
2974	....do, Charcoal gun No. 4. From same pig.	1.129	1.00	32,470	32,470
2975	....do, Charcoal gun No. 4. From same pig.	.798	.50	17,140	34,280
2970	Clifton No. 5, pig	1.129	1.00	14,580	14,580
2971	....do	1.129	1.00	14,710	14,710
2972	Richmond No. 4, gun iron pig	1.129	1.00	26,450	26,450
2973	....do	1.129	1.00	25,810	25,810
2983	....do	.798	.50	13,910	27,820
2984	....do	.798	.50	13,940	27,880

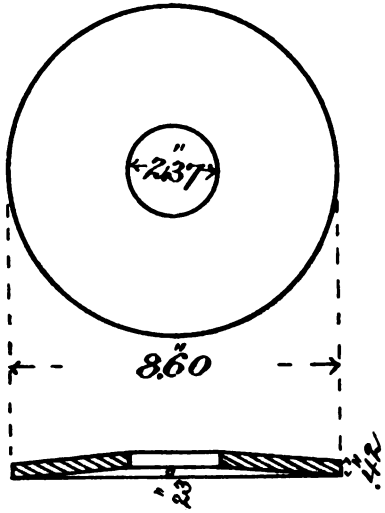
COMPRESSION

OF

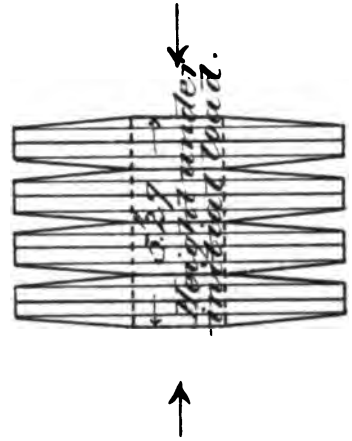
BELLEVILLE SPRINGS.

Belleville Springs, Steel.

Single Spring



Test, No. 3854



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No. 3854.

Four pairs of springs assembled and tested together.
Total height under initial load 5″.27.
Measurements showing the compression and recovery of the springs, and permanent sets, were taken between the platforms of the testing machine.

Applied loads.	Compression or recovery.		Permanent compression set.	Remarks.
	Total.	Successive.		
Pounds.	*Inch.*	*Inch.*	*Inch.*	
500	0.	0.	0.	Initial load.
1,000	.0206	.0206	.....	
1,500	.0491	.0285	.....	
2,000	.0703	.0212	.0006	
2,500	.0913	.0210	.....	
3,000	.1120	.0207	.....	
3,500	.1325	.0205	.....	
4,000	.1521	.0196	.0018	
4,500	.1718	.0197	.....	
5,000	.1911	.0193	.....	
5,500	.2108	.0197	.....	
6,000	.2298	.0190	.0013	
6,500	.2497	.0199	.....	
7,000	.2688	.0191	.....	
7,500	.2878	.0190	.....	
8,000	.3083	.0205	.0031	
8,500	.3242	.0159	.....	
9,000	.3468	.0226	.....	
9,500	.3665	.0197	.....	
10,000	.3858	.0193	.0033	
10,500	.4038	.0180	.....	
11,000	.4241	.0203	.....	
11,500	.4440	.0199	.....	
12,000	.4632	.0192	.0044	
12,500	.4833	.0201	.....	
13,000	.5026	.0193	.....	
13,500	.5233	.0207	.....	
14,000	.5420	.0187	.0071	
.....	.....	.....	.....	Rested 15 hours.
15,000	.5771	.0351	.....	
16,000	.6164	.0393	.0023	
17,000	.6571	.0407	.....	
18,000	.6984	.0413	.0042	
19,000	.7391	.0407	.....	
20,000	.7815	.0424	.0052	
21,000	.8248	.0433	.....	
22,000	.8684	.0436	.0062	
23,000	.9130	.0446	.....	
24,000	.9583	.0453	.0100	
25,000	1.0041	.0458	.....	
26,000	1.0512	.0471	.0100	
27,000	1.1008	.0496	.....	
28,000	1.1496	.0488	.0136	
29,000	1.1992	.0496	.....	
30,000	1.2524	.0532	.0163	
31,000	1.3057	.0533	.....	
32,000	1.3580	.0523	.0188	
33,000	1.4129	.0549	.....	
34,000	1.4642	.0513	.0250	
35,000	1.5182	.0540	.....	
36,000	1.5672	.0492	.0327	
37,000	1.6139	.0467	.....	
38,000	1.6464	.0325	.0407	
39,000	1.6706	.0244	.....	
40,000	1.6872	.0164	.0498	
41,000	1.7051	.0179	.....	
42,000	1.7120	.0069	.....	
43,000	1.7189	.0069	.....	
44,000	1.7261	.0072	.0598	
60,000	.....	.....	.0734	
70,000	.....	.....	.0845	
10,000	.4735	1.2526	.....	
20,000	.8840	.3105	.....	
30,000	1.3561	.4721	.....	
35,000	1.5936	.2375	.....	
40,000	1.7069	.1133	.0871	

Springs removed from machine and allowed to rest 24 days; then again assembled as before and retested.

No. 3854—Continued.

Applied loads.	Compression or recovery.		Permanent compression set.	Remarks.
	Total.	Successive.		
Pounds.	*Inch.*	*Inch.*	*Inch.*	
500	0.	0.	0.	Initial load.
4,000	.1505	.1505	.....	
8,000	.3131	.1626	.....	
12,000	.4698	.1567	.....	
16,000	.6388	.1690	.....	
20,000	.8095	.1707	.....	
24,000	.9877	.1782	.....	
28,000	1.1840	.1963	.....	
32,000	1.3873	.2033	.....	
36,000	1.5647	.1774	.....	
40,000	1.6457	.0810	.....	
44,000	1.6840	.0383	.....	
48,000	1.7045	.0205	.....	
52,000	1.7181	.0136	.....	
48,000	1.7085	.0096	.....	
44,000	1.6926	.0159	.....	
40,000	1.6667	.0259	.....	
36,000	1.6201	.0466	.....	
32,000	1.5010	.1191	.....	
28,000	1.3448	.1562	.....	
24,000	1.1758	.1690	.....	
20,000	1.0000	.1758	.....	
16,000	.8255	.1745	.....	
12,000	.6446	.1809	.....	
8,000	.4494	.1952	.....	
4,000	.3424	.1070	.0374	
4,000	.1848	.1576	.....	
8,000	.3492	.1642	.....	
12,000	.5110	.1618	.....	
16,000	.6771	.1661	.....	
20,000	.8445	.1674	.....	
24,000	1.0240	.1795	.....	
28,000	1.2190	.1950	.....	
32,000	1.4182	.1992	.....	
36,000	1.5838	.1656	.....	
40,000	1.6554	.0716	.....	
36,000	1.6031	.0523	.....	
32,000	1.4872	.1159	.....	
36,000	1.5983	.1111	.....	
40,000	1.6550	.0567	.....	
36,000	1.6050	.0500	.....	
32,000	1.4889	.1161	.....	
28,000	1.3344	.1545	.....	
24,000	1.1685	.1659	.....	
20,000	.9952	.1733	.....	
	.9910	.0042	.....	After sustaining load 1 hour.
16,000	.8238	.1672	.....	
12,000	.6420	.1818	.....	
8,000	.4505	.1915	.....	
4,000	.2437	.2068	.0473	
4,000	.1950	.0487	.....	
8,000	.3598	.1648	.....	
12,000	.5198	.1600	.....	
16,000	.6860	.1662	.....	
20,000	.8580	.1720	.....	
24,000	1.0337	.1757	.....	
28,000	1.2345	.2008	.....	
32,000	1.4280	.1935	.....	
36,000	1.5842	.1562	.....	
40,000	1.6560	.0718	.....	
36,000	1.6045	.0515	.....	
32,000	1.4845	.1200	.....	
28,000	1.3353	.1492	.....	
24,000	1.1683	.1670	.....	
20,000	.9954	.1729	.....	
16,000	.8228	.1726	.....	
12,000	.6421	.1807	.....	
16,000	.7930	.1509	.....	
20,000	.9515	.1585	.....	
24,000	1.1178	.1663	.....	
28,000	1.2640	.1462	.....	
32,000	1.4555	.1915	.....	
36,000	1.5934	.1379	.....	
40,000	1.6545	.0611	.....	
36,000	1.6050	.0495	.....	
32,000	1.4910	.1140	.....	
28,000	1.3383	.1527	.....	

No. 3854—Continued.

Applied loads.	Compression or recovery.		Permanent compression set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inch.*	*Inch.*	
24,000	1.1712	.1671	.....	
20,000	1.0010	.1702	.....	
16,000	.8228	.1782	.....	
12,000	.6485	.1743	.....	
8,000	.4568	.1917	.....	
4,000	.2524	.2044	.0495	
Loaded ten times with 40,000 pounds, releasing to 8,000 pounds between each maximum load. Under the tenth loading the springs remained 15 minutes.				
500	.....	.....	.0540	
4,000	.2078	.1538	.....	
8,000	.3723	.1645	.....	
12,000	.5360	.1637	.....	
16,000	.6970	.1610	.....	
20,000	.8657	.1687	.....	
24,000	1.0480	.1823	.....	
28,000	1.2330	.1850	.....	
32,000	1.4324	.1994	.....	
36,000	1.5920	.1596	.....	
40,000	1.6515	.0595	.....	
36,000	1.6080	.0435	.....	
32,000	1.4980	.1100	.....	
28,000	1.3444	.1536	.....	
24,000	1.1762	.1682	.....	
20,000	1.0005	.1757	.....	
16,000	.8335	.1670	.....	
12,000	.6528	.1807	.....	
8,000	.4580	.1948	.....	
4,000	.2526	.2054	.0550	Test discontinued.
Test of one pair of springs.				
500	0.	0.	.....	Initial load.
4,000	.0382	.0382	.....	
8,000	.0817	.0435	.....	
12,000	.1247	.0430	.....	
16,000	.1637	.0390	.....	
20,000	.2036	.0399	.....	
24,000	.2437	.0401	.....	
28,000	.2967	.0530	.....	
32,000	.3469	.0502	.....	
36,000	.3920	.0451	.....	
40,000	.4170	.0250	.....	
32,000	.3725	.0445	.....	
28,000	.3330	.0395	.....	
24,000	.2892	.0438	.....	
20,000	.2458	.0434	.....	
16,000	.2012	.0446	.....	
12,000	.1566	.0446	.....	
8,000	.1032	.0534	.....	
4,000	.0547	.0485	.0040	
70,000	.....	.....	.....	This load applied and released.
500	.0087	.....	.....	
4,000	.0462	.0375	.....	
8,000	.0882	.0420	.....	
12,000	.1287	.0405	.....	
16,000	.1717	.0430	.....	
20,000	.2102	.0385	.....	
24,000	.2552	.0450	.....	
28,000	.3035	.0483	.....	
32,000	.3537	.0502	.....	
36,000	.3957	.0420	.....	
40,000	.4200	.0243	.....	
36,000	.4055	.0145	.....	
32,000	.3767	.0288	.....	
28,000	.3347	.0420	.....	
24,000	.2943	.0404	.....	
20,000	.2492	.0451	.....	
16,000	.2037	.0455	.....	
12,000	.1597	.0440	.....	
8,000	.1112	.0485	.....	
4,000	.0571	.0541	.0061	
A disc of brass ".025 thickness now placed between the two springs and loads renewed.				

No. 3854—Continued.

Applied loads.	Compression or recovery.		Permanent compression set.	Remarks.
	Total.	Successive.		
Pounds.	*Inch.*	*Inch.*	*Inch.*	
500	0.	0.	0.	Initial load.
4,000	.0392	.0392	.....	
8,000	.0807	.0415	.....	
12,000	.1194	.0387	.....	
16,000	.1596	.0402	.....	
20,000	.2031	.0435	.....	
24,000	.2438	.0407	.....	
28,000	.2915	.0477	.....	
32,000	.3405	.0490	.....	
36,000	.3851	.0446	.....	
40,000	.4115	.0264	.....	
36,000	.3982	.0133	.....	
32,000	.3708	.0274	.....	
28,000	.3331	.0377	.....	
24,000	.2909	.0422	.....	
20,000	.2482	.0427	.....	
16,000	.2032	.0450	.....	
12,000	.1580	.0452	.....	
8,000	.1081	.0499	.....	
4,000	.0574	.0507	.0040	

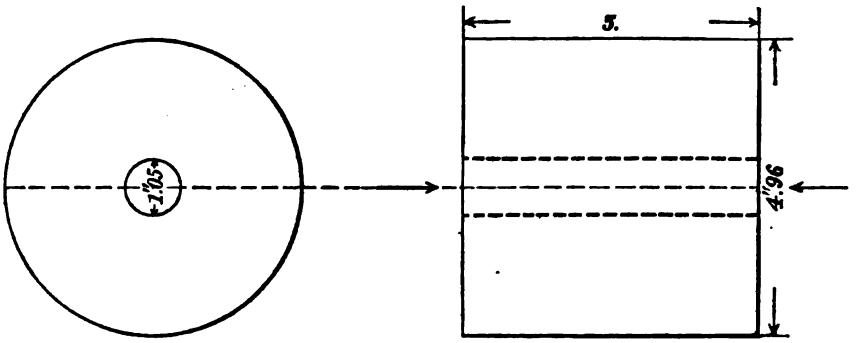
No. 4355.

Five pairs of steel springs assembled and tested together.
Total height of springs under initial load of 500 pounds, 6″.10.
Total weight, 54½ pounds.
Dimensions of single springs: Exterior diameter, 8″.60; diameter of central hole, 2″.56; thickness of metal, ″.37.
Conicity of spring, ″.25.

Applied loads.	Compression or recovery.		Permanent compression set.	Remarks.
	Total.	Successive.		
Pounds.	*Inches.*	*Inch.*	*Inch.*	
500	0.	0.	0.	Initial load.
4,000	.293	.293	.....	
8,000	.601	.308	.....	
12,000	.925	.324	.....	
16,000	1.282	.357	.....	
20,000	1.684	.402	.....	
16,000	1.384	.300	.....	
12,000	1.054	.330	.....	
8,000	.719	.335	.....	
4,000	.379	.340	.....	
500	.....	.....	.026	
4,000	.326	.300	.....	
8,000	.637	.311	.....	
12,000	.951	.314	.....	
16,000	1.315	.364	.....	
20,000	1.690	.375	.....	
24,000	1.986	.296	.....	
28,000	2.140	.154	.....	
32,000	2.230	.090	.....	
36,000	2.285	.055	.....	
40,000	2.321	.036	.....	
36,000	2.296	.025	.....	
32,000	2.258	.038	.....	
28,000	2.196	.062	.....	
24,000	1.993	.203	.....	
20,000	1.814	.179	.....	
16,000	1.616	.198	.....	
12,000	1.261	.355	.....	
8,000	.901	.300	.....	
4,000	.506	.395	.....	
500	.....	.....	.117	
12,000	1.051	.....	.....	Load left on springs Saturday night.
11,900	.....	.....	.....	Load on springs Monday morning, after forty hours' rest.
12,000	1.056	.....	.....	
500.	.....	.....	.113	
Loaded ten times with 40,000 pounds, releasing to 8,000 pounds between each maximum load. Under the tenth loading the springs remained 15 minutes.				
500	.....	.....	.163	
4,000	.452	.289	.....	
8,000	.777	.325	.....	
12,000	1.094	.317	.....	
16,000	1.471	.377	.....	
20,000	1.835	.364	.....	
24,000	2.061	.226	.....	
28,000	2.181	.120	.....	
32,000	2.251	.070	.....	
36,000	2.293	.042	.....	
40,000	2.322	.029	.....	
36,000	2.300	.022	.....	
32,000	2.263	.037	.....	
28,000	2.204	.059	.....	
24,000	2.111	.093	.....	
20,000	1.949	.162	.....	
16,000	1,667	.282	.....	
12,000	1.316	.351	.....	
8,000	.949	.367	.....	
4,000	.561	.388	.....	
500	.....	.....	.163	

COMPRESSION OF RUBBER BUFFERS.

No. 4239.



Weight, 6 pounds 4 ounces.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
5,000	.....	2.21	.10	
.....	.....	.....	.10	After 5 minutes' rest.
10,000	.....	2.86	.26	
.....	.....	.....	.20	After 5 minutes' rest.
20,000	.....	3.28	.50	
.....	.....	.....	.42	After 5 minutes' rest.

No. 4240.

Weight, 6 pounds 4½ ounces.
Length, 5".00.
Diameters, { Exterior, 4".96. Bore, 1".05.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
5,000	.....	2.03	.22	
.....	.....	.....	.18	After 5 minutes' rest.
10,000	.....	2.75	.43	
.....	.....	.....	.36	After 5 minutes' rest.
20,000	.....	3.23	.71	
.....	.....	.....	.63	After 5 minutes' rest.

No. 4241.

Weight, 6 pounds 8½ ounces.
Length, 5″.
Diameters, { Exterior, 5″. Bore, 1″.04.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
5,000	.....	1.80	.12	
.....	.....	.....	.08	After 5 minutes' rest.
10,000	.....	2.59	.28	
.....	.....	.....	.24	After 5 minutes' rest.
20,000	.....	3.10	.47	
.....	.....	.....	.40	After 5 minutes' rest.

No. 4242.

Weight, 6 pounds 8½ ounces.
Length, 5″.01.
Diameters, { Exterior, 5″. Bore, 1″.05.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
5,000	.....	1.79	.10	
.....	.....	.....	.07	After 5 minutes' rest.
10,000	.....	2.61	.27	
.....	.....	.....	.21	After 5 minutes' rest.
20,000	.....	3.14	.44	
.....	.....	.....	.38	After 5 minutes' rest.

No. 4243.

Weight, 6 pounds 3½ ounces.
Length, 5″.
Diameters, { Exterior, 4″.94. Bore, 1″.05.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
5,000	.....	2.07	.20	
.....	.....	.....	.14	After 5 minutes' rest.
10,000	.....	2.76	.37	
.....	.....	.....	.30	After 5 minutes' rest.
20,000	.....	3.23	.57	
.....	.....	.....	.47	After 5 minutes' rest.

No. 4267.

Weight, 6 pounds 6 ounces.
Length, 4″.98.
Diameters, { Exterior, 4″.99.
Bore, 1″.05.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
3,370	.....	1.25	.08	
.....	.....	.....	.05	After 2½ hours' rest.
.....	.....	.....	.05	After 21½ hours' rest.
.....	.....	.....	.04	After 24 hours' rest.

No. 4268.

Weight, 6 pounds 5 ounces.
Length, 5″.03.
Diameters, { Exterior, 4″.93.
Bore, 1″.06.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
3,285	....	1.26	.06	
.....	.....	.....	.03	After 2½ hours' rest.
.....	.....	.....	.01	After 21½ hours' rest.
.....	.....	.....	.01	After 24 hours' rest.

No. 4269.

Weight, 6 pounds 8 ounces.
Length, 5″.06.
Diameters, { Exterior, 4″.98.
Bore, 1″.06.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
6,710	.....	2.10	.14	
.....	.....	.....	.07	After 2½ hours' rest.
.....	.....	.....	.05	After 21½ hours' rest.
.....	.....	.....	.04	After 24 hours' rest.

No. 4270.

Weight, 6 pounds 5 ounces.
Length, 4″.97.
Diameters, { Exterior, 4″.94. Bore, 1″.06.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches*	*Inch.*	
6,600	.....	2.07	.09	
.....	.....	.....	.05	After 2½ hours' rest.
.....	.....	.....	.04	After 20 hours' rest.
.....	.....	.....	.03	After 24 hours' rest.

No. 4271.

Weight, 6 pounds 5 ounces.
Length, 4″.96.
Diameters, { Exterior, 4″.99. Bore, 1″.06.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
13,480	.....	2.83	.29	
.....	.....	.....	.20	After 2½ hours' rest.
.....	.....	.....	.19	After 20 hours' rest.
.....	.....	.....	.19	After 24 hours' rest.

No. 4272.

Weight, 6 pounds 6 ounces.
Length, 5″.01.
Diameters, { Exterior, 4″.99. Bore, 1″.06.

Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch*	
13,480	.....	2.86	.33	
.....	.....	.....	.24	After 2½ hours' rest.
.....	.....	.....	.23	After 20 hours' rest.
.....	.....	.....	.23	After 24 hours' rest.

No. 4347.

Weight, 10 pounds 14 ounces.
Length, 6″.03.
Diameters, { Exterior, 5″.93. Bore, 1″.18.

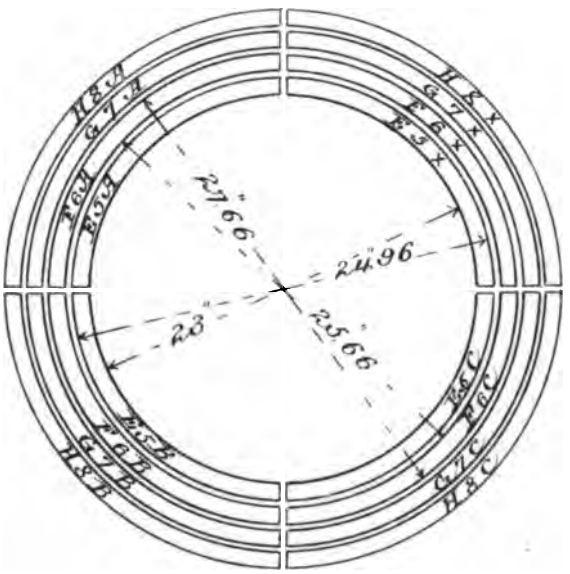
Applied loads.		In total length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
5,000	.....	1.27	.01	
10,000	.....	2.29	.03	
20,000	.....	3.21	.11	Immediate set.
.....	.....	.....	.05	After 20 minutes.

QUADRANTS FROM DISCS OF 12-INCH B. L. RIFLED MORTAR BODIES NOS. 12 AND 24.

Tested by compressive stress applied in the direction of the chord of the quadrant. Length of disc, cast-iron body No. 12, ".75, body No. 24, ".97.

12-inch B.L. Rifled Mortars.

Quadrants from C.I. Body No. 24.



Direction → ← Length → loaded.

Axis

H Ex 165 51 2

QUADRANTS FROM CAST-IRON BODY No. 24.

No. of test.	Ring and quadrant.	Chord. Length.	Chord. Versed sine.	Ultimate resistance, total.	Total compression in length of chord between 200 pounds load, and time of rupture.	Thickness of ring at place of rupture.	Location and appearance of fracture.
		Inches.	*Inches.*	*Pounds.*	*Inch.*	*Inches.*	
4291	H_3 A	23.40	4.80	2,036	.....	1.05	1½" eccentric, granular
4292	H_3 B	23.47	4.83	2,093	.50	1.08	1½" eccentric, granular
4293	H_3 C	23.40	4.74	1,898	.52	1.00	2".3 eccentric, granular
4294	H_3 X	23.36	4.82	2,088	.53	1.06	1".25 eccentric, granular
4295	G_7 A	21.38	4.39	1,985	.52	.99	1".12 eccentric, granular, mottled.
4296	G_7 B	21.37	4.39	2,095	.58	1.00+	".50 eccentric, granular.
4297	G_7 C	21.34	4.36	2,132	.58	1.00+	".05 eccentric, granular.
4298	G_7 X	21.35	4.36	1,992	.54	1.00	1".30 eccentric, granular, 1".9 from mark X.
4299	F_6 A	19.47	4.00	2,324	.39	1.02	".75 eccentric, granular.
4300	F_6 B	19.47	3.99	2,188	.40	.99	".25 eccentric, granular.
4301	F_6 C	19.49	3.96	2,130	.40	.98	".90 eccentric, granular.
4302	F_6 X	19.49	4.02	2,194	.42	.99	2".00 eccentric, granular, 1".85 from mark X
4303	E_5 A	17.55	3.60	2,428	.31	1.00	".90 eccentric, granular, mottled.
4304	E_5 B	17.54	3.58	2,366	.30	.99	".10 eccentric, granular, mottled.
4305	E_5 C	17.54	3.59	2,328	.28	.99	".75 eccentric, granular, mottled.
4306	E_5 X	17.53	3.58	2,391	.29	.99	".10 eccentric, granular, mottled', '.4 from mark X.

QUADRANTS FROM RING E_5—CAST-IRON BODY No. 12.

4307	E_5 A	17.20	3.54	2,058	.24	1.00	".80 eccentric, granular, light mottled.
4308	E_5 B	17.20	3.47	2,198	.28	1.02	".37 eccentric, granular, light mottled.
4309	E_5 C	17.22	3.52	2,187	.25	1.02	".50 eccentric, granular, light mottled.
4310	E_5 X	17.23	3.52	2,016	.24	1.00	".50 eccentric, granular, light mottled.

TENSILE TESTS

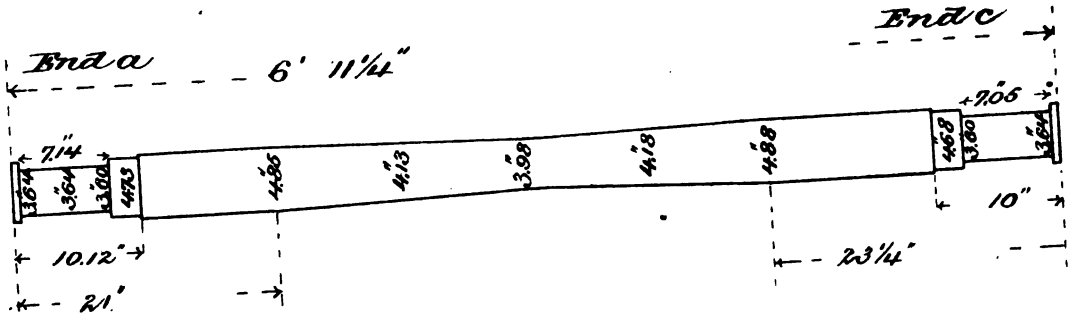
OF

SPECIMENS FROM MUCK BAR TENDER AXLES NOS. 7, 8, AND 9.

Continuation of tests. See Report, 1888.

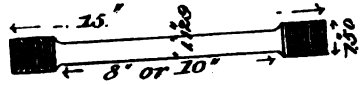
No. 7.

Muck bar axle



Specimens

Form of specimens.



HEx 165 51 2

Axles Nos. 7 and 8 were run 317,028 miles each, and axle No. 9, 319,229 miles.

When received for testing the journals of the axles were examined for incipient cracks, and their alignment ascertained by mounting upon centers; afterward the axles were cut up and tensile specimens taken, three from each end and three from the middle section of each.

The journals of axle No. 7 presented a slightly mottled appearance, but no cracks were visible. The journals ran out of line at their inner ends when mounted upon centers; end A $\frac{1}{8}$ inch, and end C $\frac{1}{16}$ inch, and were bent in the opposite direction.

Journal A of axle No. 8 showed no unusual appearance. Journal C, however, was slightly mottled at the inner end, and there was visible to the unaided eye a fine crack 1.65 inches long, located at the base of the fillet, .16 of an inch from the inside end of the journal.

Mounted upon centers journal A ran out of line .20 of an inch; journal C .18 of an inch, both being bent in the same direction.

The crack in journal C was quartering with the concave side of the bend.

Journal A of axle No. 9 had a mottled appearance, and there was a crack in sight 1.75 inches long visible to the unaided eye. There was also a shorter crack ".25 long on the opposite side of the journal. These cracks were located at the base of the fillet at the inner end of the journal.

Fractured specimen No. 4186 from end C of axle No. 8 displayed a crack on the side which was next the journal-bearing, and in the vicinity of the neck at the inner end of the journal.

The location of the crack and its appearance leads to the conclusion that it was a part of the crack observed before the axle was cut into specimens, and notwithstanding its presence rupture of the specimen occurred 2½ inches from that place.

SPECIMENS FROM AXLE NO. 7.

No. 4170.

Marks, $\frac{MB7}{a}$
Diameter, 1″.129.
Sectional area, 1. square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0010	.....	
10,000	10,000	.0025	0.	
15,000	15,000	.0039	0.	
18,000	18,000	.0050	.....	
19,000	19,000	.0056	.....	Elastic limit.
20,000	20,000	.0125	.0070	
21,000	21,000	.0170	.....	
22,000	22,000	.0267	.....	
23,000	23,000	.0345	.....	
24,000	24,000	.0470	.....	
25,000	25,000	.0605	.....	
26,000	26,000	.0800	.....	
27,000	27,000	.0990	.....	
28,000	28,000	.1230	.....	
29,000	29,000	.1435	.....	
30,000	30,000	.17	.....	
31,000	31,000	.20	.....	
32,000	32,000	.22	.....	
33,000	33,000	.27	.....	
34,000	34,000	.29	.....	
35,000	35,000	.31	.....	
36,000	36,000	.35	.....	
37,000	37,000	.40	.....	
38,000	38,000	.44	.....	
39,000	39,000	.49	.....	
40,000	40,000	.57	.....	
41,000	41,000	.62	.....	
42,000	42,000	.70	.....	
43,000	43,000	.82	.....	
44,000	44,000	.98	.....	
45,000	45,000	1.22	.....	
45,790	45,790	1.68	.....	Tensile strength.
40,200	.....	.....	.....	At time of fracture.
0	0	2.28	.....	=28.5 per cent.

Elongation of inch sections, ″.20, ″.24, ″.26, ″.40, ″.58*, ″.23, ″.19, ″.18.
Fractured ″.25 from middle of stem, or 7½″ from the end of the axle.
Appearance, fibrous.
Diameter at fracture, ″.86. Area, .581 square inch.
Contraction of area, 41.9 per cent.

No. 4171.

Marks, $\frac{M\,B,}{a}$
Diameter, 1″.129.
Sectional area, 1. square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0010	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	0.	
16,000	16,000	.0042	.....	
17,000	17,000	.0045	.....	
18,000	18,000	.0049	.....	
19,000	19,000	.0053	.....	Elastic limit.
20,000	20,000	.0072	.....	
21,000	21,000	.0195	.....	
22,000	22,000	.0285	.....	
23,000	23,000	.0413	.....	
24,000	24,000	.0555	.....	
25,000	25,000	.0670	.....	
26,000	26,000	.0870	.....	
27,000	27,000	.1075	.....	
28,000	28,000	.1290	.....	
29,000	29,000	.1525	.....	
30,000	30,000	.1750	.....	
31,000	31,000	.20	.....	
32,000	32,000	.22	.....	
33,000	33,000	.26	.....	
34,000	34,000	.29	.....	
35,000	35,000	.32	.....	
36,000	36,000	.36	.....	
37,000	37,000	.40	.....	
38,000	38,000	.45	.....	
39,000	39,000	.50	.....	
40,000	40,000	.58	.....	
41,000	41,000	.65	.....	
42,000	42,000	.76	.....	
43,000	43,000	.90	.....	
44,000	44,000	1.08	.....	
44,860	44,860	1.50	.....	Tensile strength.
39,900	.....	.....	.....	At time of rupture.
0	0	1.90	.....	=23.7 per cent.

Elongation of inch sections, ″.16 ″.17. ″.17 ″.23 ″.44* ″.41* ″.19 ″.13
Fractured 3″.75 from neck, or 8½″ from end of axle. Appearance, fibrous.
Diameter at fracture, ″.85. Area, .567 square inch.
Contraction of area, 43.3 per cent.

No. 4172.

Marks, $\frac{M\ B}{a}$,
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0010	.....	
10,000	10,000	.0025	.0001	
15,000	15,000	.0040	.0001	
16,000	16,000	.0044	.....	
17,000	17,000	.0047	.....	Elastic limit.
18,000	18,000	.0053	.....	
19,000	19,000	.0065	.....	
20,000	20,000	.0122	.....	
21,000	21,000	.0173	.....	
22,000	22,000	.0240	.....	
23,000	23,000	.0328	.....	
24,000	24,000	.0428	.....	
25,000	25,000	.0536	.....	
26,000	26,000	.0725	.....	
27,000	27,000	.0850	.....	
28,000	28,000	.1015	.....	
29,000	29,000	.1190	.....	
30,000	30,000	.1370	.....	
31,000	31,000	.1605	.....	
32,000	32,000	.19	.....	
33,000	33,000	.22	.....	
34,000	34,000	.26	.....	
35,000	35,000	.29	.....	
36,000	36,000	.32	.....	
37,000	37,000	.37	.....	
38,000	38,000	.41	.....	
39,000	39,000	.47	.....	
40,000	40,000	.52	.....	
41,000	41,000	.59	.....	
42,000	42,000	.69	.....	
43,000	43,000	.80	.....	
44,000	44,000	.97	.....	
45,000	45,000	1.27	.....	Tensile strength.
0	0	1.74	.....	=71.7 per cent.

Elongation of inch sections, ″.15, ″.25, ″.60*, ″.28, ″.14, ″.12, ″.10, ″.10.

Fractured 3″.4 from the neck or $8\frac{5}{8}$″ from the end of the axle. Appearance, fibrous.

Diameter at fracture, ″.84. Area, .554 square inch.

Contraction of area, 44.6 per cent.

No. 4173.

Marks, $\frac{M\ B_7}{b}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.....	
10,000	10,000	.0032	0.	
15,000	15,000	.0049	0.	
20,000	20,000	.0067	0.	
21,000	21,000	.0071	.....	
22,000	22,000	.0076	.....	
23,000	23,000	.0081	.....	Elastic limit.
24,000	24,000	.0092	.....	
25,000	25,000	.0258	.....	
26,000	26,000	.0348	.....	
27,000	27,000	.0535	.....	
28,000	28,000	.0832	.....	
29,000	29,000	.0930	.....	
30,000	30,000	.1300	.....	
31,000	31,000	.1525	.....	
32,000	32,000	.19	.....	
33,000	33,000	.24	.....	
34,000	34,000	.28	.....	
35,000	35,000	.32	.....	
36,000	36,000	.38	.....	
37,000	37,000	.43	.....	
38,000	38,000	.49	.....	
39,000	39,000	.54	.....	
40,000	40,000	.63	.....	
41,000	41,000	.73	.....	
42,000	42,000	.86	.....	
43,000	43,000	1.00	.....	
44,000	44,000	1.22	.....	
45,000	45,000	1.53	.....	
45,420	45,420	2.10	.....	Tensile strength.
40,200	.....	.....	.....	At time of rupture.
0	0	2.46	.....	= 24.6 per cent.

Elongation of inch sections, ″.17, ″.17, ″.16, ″.17, ″.20, ″.29, ″.59*, ″.26, ″.22, ″.23.
Fractured 6″ from the neck. Appearance, fibrous, lamellar.
Diameter at fracture, ″.83. Area, .541 square inch.
Contraction of area, 45.9 per cent.

No. 4174.

Marks, $\frac{M\ B,}{b}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0014	.....	
10,000	10,000	.0032	0.	
15,000	15,000	.0050	0.	
20,000	20,000	.0067	0.	
21,000	21,000	.0071	.....	
22,000	22,000	.0076	.....	
23,000	23,000	.0081	.....	Elastic limit.
24,000	24,000	.0091	.....	
25,000	25,000	.0171	.0083	
26,000	26,000	.0380	.....	
27,000	27,000	.0635	.....	
28,000	28,000	.0865	.....	
29,000	29,000	.1115	.....	
30,000	30,000	.1395	.....	
31,000	31,000	.17	.....	
32,000	32,000	.20	.....	
33,000	33,000	.24	.....	
34,000	34,000	.28	.....	
35,000	35,000	.32	.....	
36,000	36,000	.37	.....	
37,000	37,000	.42	.....	
38,000	38,000	.49	.....	
39,000	39,000	.55	.....	
40,000	40,000	.62	.....	
41,000	41,000	.72	.....	
42,000	42,000	.83	.....	
43,000	43,000	1.00	.....	
44,000	44,000	1.19	.....	
45,000	45,000	1.51	.....	
45,640	45,640	2.08	.....	Tensile strength.
38,600	.....	.....	.....	At time of rupture.
0	0	2.65	.....	=26.5 per cent.

Elongation of inch sections, ″.18, ″.18, ″.20, ″.20, ″.23, ″.33, ″.60*, ″.28, ″.24, ″.21.
Fractured 6″ from the neck. Appearance, fibrous.
Diameter at fracture, ″.81; area, .515 square inch.
Contraction of area, 48.5 per cent.

No. 4175.

Marks, $\frac{M\,B}{b}$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.....	
10,000	10,000	.0031	0.	
15,000	15,000	.0049	0.	
20,000	20,000	.0066	0.	
21,000	21,000	.0070	.....	
22,000	22,000	.0074	.....	
23,000	23,000	.0079	.....	Elastic limit.
24,000	24,000	.0086	.....	
25,000	25,000	.0098	.0015	
26,000	26,000	.0260	.....	
27,000	27,000	.0452	.....	
28,000	28,000	.0770	.....	
29,000	29,000	.1025	.....	
30,000	30,000	.1240	.....	
31,000	31,000	.1560	.....	
32,000	32,000	.1825	.....	
33,000	33,000	.23	.....	
34,000	34,000	.26	.....	
35,000	35,000	.30	.....	
36,000	36,000	.35	.....	
37,000	37,000	.40	.....	
38,000	38,000	.45	.....	
39,000	39,000	.52	.....	
40,000	40,000	.58	.....	
41,000	41,000	.67	.....	
42,000	42,000	.78	.....	
43,000	43,000	.90	.....	
44,000	44,000	1.08	.....	
45,000	45,000	1.31	.....	
45,880	45,880	2.03	.....	Tensile strength.
39,900	.....	.....	.....	At time of rupture.
0	0	2.73	.....	=27.3 per cent.

Elongation of inch sections, ″.27, ″.23, ″.25, ″.28, ″.58*, ″.36, ″.21, ″.18, ″.18, ″.18.
Fractured at middle of stem. Appearance, fibrous, lamellar.
Diameter at fracture, ″.82. Area, .528 square inch.
Contraction of area, 47.2 per cent.

No. 4176.

Marks, $\frac{M\ B_7}{c}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	.....	
10,000	10,000	.0025	.....	
15,000	15,000	.0038	0.	
18,000	18,000	.0048	.....	
19,000	19,000	.0053	.....	Elastic limit.
20,000	20,000	.0085	.....	
21,000	21,000	.0161	.....	
22,000	22,000	.0246	.....	
23,000	23,000	.0341	.....	
24,000	24,000	.0468	.....	
25,000	25,000	.0618	.....	
26,000	26,000	.0815	.....	
27,000	27,000	.0983	.....	
28,000	28,000	.1213	.....	
29,000	29,000	.1408	.....	
30,000	30,000	.18	.....	
31,000	31,000	.20	.....	
32,000	32,000	.22	.....	
33,000	33,000	.26	.....	
34,000	34,000	.30	.....	
35,000	35,000	.32	.....	
36,000	36,000	.37	.....	
37,000	37,000	.40	.....	
38,000	38,000	.45	.....	
39,000	39,000	.50	.....	
40,000	40,000	.58	.....	
41,000	41,000	.68	.....	
42,000	42,000	.77	.....	
43,000	43,000	.90	.....	
44,000	44,000	1.10	.....	
44,640	44,640	1.50	.....	Tensile strength.
0	0	1.79	.....	=22.4 per cent.

Elongation of inch sections, ″.15, ″.18, ″.30, ″.59, ″.19, ″.13, ″.14, ″.11.
Fractured 4″.25 from the neck or 8½″ from the end of the axle. Appearance, fibrous, seamy.
Diameter at fracture, ″.86. Area, .581 square inch.
Contraction of area, 41.9 per cent.

No. 4177.

Marks, $\frac{M\ B_7}{e}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	0.	
17,000	17,000	.0046	.....	
18,000	18,000	.0049	.....	
19,000	19,000	.0052	.....	
20,000	20,000	.0057	.0004	Elastic limit.
21,000	21,000	.0069	.....	
22,000	22,000	.0240	.....	
23,000	23,000	.0395	.....	
24,000	24,000	.0630	.....	
25,000	25,000	.0800	.....	
26,000	26,000	.0970	.....	
27,000	27,000	.1130	.....	
28,000	28,000	.1350	.....	
29,000	29,000	.1550	.....	
30,000	30,000	.18	.....	
31,000	31,000	.21	.....	
32,000	32,000	.23	.....	
33,000	33,000	.27	.....	
34,000	34,000	.31	.....	
35,000	35,000	.34	.....	
36,000	36,000	.38	.....	
37,000	37,000	.42	.....	
38,000	38,000	.48	.....	
39,000	39,000	.54	.....	
40,000	40,000	.62	.....	
41,000	41,000	.71	.....	
42,000	42,000	.82	.....	
43,000	43,000	.98	.....	
44,000	44,000	1.21	.....	
44,380	44,380	1.47	.....	Tensile strength.
38,000	.....	.....	.....	At time of rupture.
0	0	1.80	.....	= 22 5 per cent.

Elongation of inch sections, ″.13, ″.15, ″.19, ″.32, ″.51*, ″.20, ″.15, ″.15.

Fractured at middle of stem, or $7\frac{3}{4}$″ from the end of the axle. Appearance, fibrous.

Diameter at fracture, ″.84. Area, .554 square inch.

Contraction of area, 44.6 per cent.

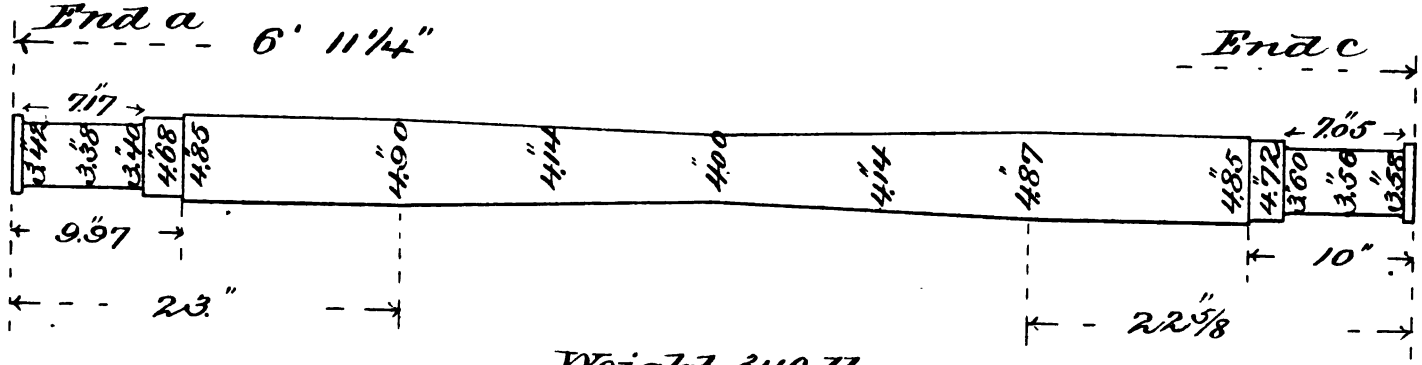
No. 4178.

Marks, $\frac{M\ B}{c}$
Diameter, 1″.129.
Sectional area, 1. square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inches.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0012	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0042	.0002	
16,000	16,000	.0046	.....	Elastic limit.
17,000	17,000	.0052	.....	
18,000	18,000	.0059	.....	
19,000	19,000	.0075	.....	
20,000	20,000	.0148	.0095	
21,000	21,000	.0261	.....	
22,000	22,000	.0340	.....	
30,000	30,000	.1920	.....	
31,000	31,000	.22	.....	
32,000	32,000	.25	.....	
33,000	33,000	.29	.....	
34,000	34,000	.32	.....	
35,000	35,000	.36	.....	
36,000	36,000	.40	.....	
37,000	37,000	.44	.....	
38,000	38,000	.50	.....	
39,000	39,000	.57	.....	
40,000	40,000	.63	.....	
41,000	41,000	.71	.....	
42,000	42,000	.82	.....	
43,000	43,000	.97	.....	
44,000	44,000	1.22	.....	
44,060	44,060	1.37	.....	Tensile strength.
32,200	.....	.....	.....	At time of rupture.
0	0	1.73	.....	=21.6 per cent.

Elongation of inch sections, ″.13 ″.16 ″.19 ″.27 ″.57 ″.17 ″.13 ″.11.
Fractured 4″ from the neck, or 6″.75 from the end of the axle.
Appearance, fibrous, seamy.
Diameter at fracture, ″.87. Area, .594 square inch.
Contraction of area, 40.6 per cent.

Muck bar axle No. 8.



Weight 346 lbs.

Specimens.

H Ex. 165 51 2

SPECIMENS FROM AXLE NO. 8.

No. 4179.

Marks, $\frac{M\ B_8}{a}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0010	.....	
10,000	10,000	.0025	0.	
15,000	15,000	.0039	0.	
16,000	16,000	.0041	.....	
17,000	17,000	.0044	.....	
18,000	18,000	.0047	.....	Elastic limit.
19,000	19,000	.0057	.....	
20,000	20,000	.0081	.....	
21,000	21,000	.0114	.....	
22,000	22,000	.0168	.....	
23,000	23,000	.0255	.....	
24,000	24,000	.0420	.....	
25,000	25,000	.0555	.....	
26,000	26,000	.0741	.....	
27,000	27,000	.0940	.....	
28,000	28,000	.1157	.....	
29,000	29,000	.1395	.....	
30,000	30,000	.1585	.....	
31,000	31,000	.19	.....	
32,000	32,000	.22	.....	
33,000	33,000	.25	.....	
34,000	34,000	.28	.....	
35,000	35,000	.31	.....	
36,000	36,000	.35	.....	
37,000	37,000	.40	.....	
38,000	38,000	.44	.....	
39,000	39,000	.50	.....	
40,000	40,000	.57	.....	
41,000	41,000	.64	.....	
42,000	42,000	.74	.....	
43,000	43,000	.84	.....	
44,000	44,000	1.03	.....	
45,000	45,000	1.50	.....	Tensile strength.
0	0	1.71	.....	=21.4 per cent.

Elongation of inch sections: ″.12, ″.15, ″.16, ″.19, ″.25, ″.23, ″.43*, ″.18.

Fractured 2″.5 from neck, or 9½″ from the end of axle. Appearance fibrous, lamellar. Numerous cracks developed during the test in the surface of the stem, beginning at a point 7″ from the end of the axle and extending along 4″ to the neck of the specimen, which was 11½″ from the end of the axle. The cracks were principally confined to that half of the cylindrical surface which laid nearest the surface of the journal of the axle.

Diameter at fracture, ″.95; area, .709 square inch.

Contraction of area, 29.1 per cent.

No. 4180.

Marks, $\frac{M\ B_s}{a}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0010	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	0.	
16,000	16,000	.0043	.....	
17,000	17,000	.0047	.....	
18,000	18,000	.0050	.....	
19,000	19,000	.0054	.....	Elastic limit.
20,000	20,000	.0080	.....	
21,000	21,000	.0128	.....	
22,000	22,000	.0215	.....	
23,000	23,000	.0355	.....	
24,000	24,000	.0450	.....	
25,000	25,000	.0500	.....	
26,000	26,000	.0710	.....	
27,000	27,000	.0900	.....	
28,000	28,000	.1085	.....	
29,000	29,000	.1295	.....	
30,000	30,000	.1540	.....	
31,000	31,000	.1768	.....	
32,000	32,000	.20	.....	
33,000	33,000	.23	.....	
34,000	34,000	.27	.....	
35,000	35,000	.30	.....	
36,000	36,000	.35	.....	
37,000	37,000	.38	.....	
38,000	38,000	.43	.....	
39,000	39,000	.49	.....	
40,000	40,000	.56	.....	
41,000	41,000	.63	.....	
42,000	42,000	.74	.....	
43,000	43,000	.87	.....	
44,000	44,000	1.00	.....	
44,720	44,720	1.33	.....	Tensile strength.
0	.....	1.57	.....	=19.6 per cent.

Elongation of inch sections: ″.10, ″.11, ″.12, ″.15, ″.19, ″.21, ″.37*, ″.32*.
Fractured 1″.30 from the neck, or 10½″ from the end of the axle.
Appearance, fibrous, seamy.
Diameter at fracture, ″.91. Area, .650 square inch.
Contraction of area, 35. per cent.

No. 4181.

Marks, $\frac{MB}{a}$.
Diameter, 1″.035.
Sectional area, .841 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
841	1,000	0.	0.	Initial load.
4,205	5,000	.0011	0.	
8,410	10,000	.0024	0.	
12,615	15,000	.0038	0.	
13,456	16,000	.0040	.....	
14,297	17,000	.0042	.....	
15,138	18,000	.0045	.....	
15,979	19,000	.0049	.....	
16,820	20,000	.0053	.0001	Elastic limit.
17,661	21,000	.0076	.....	
18,502	22,000	.0135	.....	
19,343	23,000	.0210	.....	
20,184	24,000	.0315	.....	
21,025	25,000	.0445	.....	
21,866	26,000	.0592	.....	
22,707	27,000	.0703	.....	
23,548	28,000	.0834	.....	
24,389	29,000	.1028	.....	
25,230	30,000	.1220	.....	
26,071	31,000	.1400	.....	
26,912	32,000	.1665	.....	
27,753	33,000	.19	.....	
28,594	34,000	.22	.....	
29,435	35,000	.25	.....	
30,276	36,000	.30	.....	
31,117	37,000	.34	.....	
31,958	38,000	.38	.....	
32,799	39,000	.42	.....	
33,640	40,000	.48	.....	
34,481	41,000	.56	.....	
35,322	42,000	.63	.....	
36,163	43,000	.75	.....	
36,900	43,880	.....	.....	Tensile strength.
0	0	1.04	.....	=13 per cent.

Elongation of inch sections: ″.13, ″.35*, ″.13, ″.12, ″.10, ″.09, ″.07, ″.05.

Fractured 2″ from the neck, or 9¾″ from the end of the axle. Appearance, fibrous, lamellar.

Numerous cracks were developed in the cylindrical surface of the stem, at a distance of 7″ to 10″ from the end of the axle.

Diameter at fracture ″.87. Area, ″.594.

Contraction of area, 29.4 per cent.

No. 4182.

Marks, $^{M\,B_6}_{b}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.....	
10,000	10,000	.0032	0.	
15,000	15,000	.0050	0.	
20,000	20,000	.0069	.0001	
21,000	21,000	.0073	.....	
22,000	22,000	.0078	.....	
23,000	23,000	.0083	.....	Elastic limit.
24,000	24,000	.0090	.....	
25,000	25,000	.0108	.0023	Rested under initial load 1 hour.
26,000	26,000	.0190	.....	
27,000	27,000	.0305	.....	
28,000	28,000	.0480	.....	
29,000	29,000	.0650	.....	
30,000	30,000	.0950	.....	
31,000	31,000	.1395	.....	
32,000	32,000	.17	.....	
33,000	33,000	.20	.....	
34,000	34,000	.24	.....	
35,000	35,000	.28	.....	
36,000	36,000	.32	.....	
37,000	37,000	.35	.....	
38,000	38,000	.41	.....	
39,000	39,000	.49	.....	
40,000	40,000	.54	.....	
41,000	41,000	.62	.....	
42,000	42,000	.74	.....	
43,000	43,000	.86	.....	
44,000	44,000	1.00	.....	
45,000	45,000	1.22	.....	
46,000	46,000	1.58	.....	
46,460	46,460	2.00	.....	Tensile strength.
39,800	.....	.....	.....	At time of rupture.
0	0	2.50	.....	=25 per cent.

Elongation of inch sections, ″.17, ″.18, ″.22, ″.53*, ″.41, ″.23, ″.23, ″.20, ″.17, ″.16.
Fractured 6″ from the neck. Appearance, fibrous.
Diameter at fracture, ″.82. Area, .528 square inch.
Contraction of area, 47.2 per cent.

No. 4183.

Marks, $\frac{M\ Be}{b}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.....	
10,000	10,000	.0032	0.	
15,000	15,000	.0050	0.	
20,000	20,000	.0068	0.	
21,000	21,000	.0072	.....	
22,000	22,000	.0077	.....	
23,000	23,000	.0083	.....	Elastic limit.
24,000	24,000	.0092	.....	
25,000	25,000	.0130	.0044	
26,000	26,000	.0248	.....	
27,000	27,000	.0428	.....	
28,000	28,000	.0570	.....	
29,000	29,000	.0770	.....	
30,000	30,000	.1125	.....	
31,000	31,000	.1495	.....	
32,000	32,000	.20	.....	
33,000	33,000	.22	.....	
34,000	34,000	.26	.....	
35,000	35,000	.29	.....	
36,000	36,000	.34	.....	
37,000	37,000	.39	.....	
38,000	38,000	.45	.....	
39,000	39,000	.52	.....	
40,000	40,000	.58	.....	
41,000	41,000	.68	.....	
42,000	42,000	.78	.....	
43,000	43,000	.90	.....	
44,000	44,000	1.09	.....	
45,000	45,000	1.34	.....	
46,000	46,000	1.85	.....	Tensile strength.
0	0	2.36	.....	=23.6 per cent.

Elongation of inch sections: ″.16, ″.19, ″.26, ″.60*, ″.28, ″.30, ″.18, ″.16, ″.16, ″.17.
Fractured 5″.5 from the neck. Appearance, fibrous.
Diameter at fracture, ″.83. Area, .541 square inch.
Contraction of area, 45.9 per cent.

No. 4184.

Marks, $\frac{M}{b}B_s$
Diameter, 1″.129.
Sectional area, 1. square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load,
5,000	5,000	.0012	.....	
10,000	10,000	.0031	0.	
15,000	15,000	.0050	0.	
20,000	20,000	.0071	.0002	
21,000	21,000	.0077	.....	
22,000	22,000	.0081	.....	Elastic limit.
23,000	23,000	.0091	.....	
24,000	24,000	.0106	.....	
25,000	25,000	.0158	.0070	
26,000	26,000	.0259	.....	
27,000	27,000	.0375	.....	
28,000	28,000	.0730	.....	
29,000	29,000	.0992	.....	
30,000	30,000	.1248	.....	
31,000	31,000	.1560	.....	
32,000	32,000	.1880	.....	
33,000	33,000	.22	.....	
34,000	34,000	.27	.....	
35,000	35,000	.31	.....	
36,000	36,000	.36	.....	
37,000	37,000	.42	.....	
38,000	38,000	.47	.....	
39,000	39,000	.56	.....	
40,000	40,000	.63	.....	
41,000	41,000	.73	.....	
42,000	42,000	.85	.....	
43,000	43,000	1.02	.....	
44,000	44,000	1.22	.....	
45,000	45,000	1.63	.....	
45,510	45,510	2.20	.....	Tensile strength.
39,700	.....	.....	.....	At time of rupture.
0	0	2.50	.....	=25. per cent.

Elongation of inch sections : ″.22, ″.25, ″.45*, ″.48*, ″.23, ″.18, ″.21, ″.17, ″.18, ″.13.

Fractured 5″ from the neck. Appearance, fibrous, seamy.
Diameter at fracture, ″.83. Area, .541 square inch.
Contraction of area, 45.9 per cent.

No. 4185.

Marks, $\frac{M\ B_3}{c}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	.....	
10,000	10,000	.0026	0.	
15,000	15,000	.0040	0.	
16,000	16,000	.0043	.....	
17,000	17,000	.0046	.....	
18,000	18,000	.0049	.....	
19,000	19,000	.0053	.....	Elastic limit.
20,000	20,000	.0066	.....	
21,000	21,000	.0131	.....	
22,000	22,000	.0210	.....	
23,000	23,000	.0370	.....	
24,000	24,000	.0547	.....	
25,000	25,000	.0651	.....	
26,000	26,000	.0830	.....	
27,000	27,000	.1053	.....	
28,000	28,000	.1230	.....	
29,000	29,000	.1458	.....	
30,000	30,000	.17	.....	
31,000	31,000	.20	.....	
32,000	32,000	.22	.....	
33,000	33,000	.25	.....	
34,000	34,000	.29	.....	
35,000	35,000	.32	.....	
36,000	36,000	.36	.....	
37,000	37,000	.40	.....	
38,000	38,000	.46	.....	
39,000	39,000	.51	.....	
40,000	40,000	.57	.....	
41,000	41,000	.66	.....	
42,000	42,000	.75	.....	
43,000	43,000	.90	.....	
44,000	44,000	1.07	.....	
44,870	44,870	1.50	.....	Tensile strength.
0	0	1.83	.....	=22.9 per cent.

Elongation of inch sections: ″.19, ″.49*, ″.31, ″.28, ″.20, ″.13, ″.13, ″.10.
Fractured 2″.25 from the neck, or $9\frac{3}{4}$″ from the end of the axle. Appearance, fibrous, seamy.
Diameter at fracture, .″91; area, .650 square inch.
Contraction of area, 35 per cent.

No. 4186.

Marks, $\frac{M B_2}{c}$.

Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	.....	
10,000	10,000	.0027	.0001	
15,000	15,000	.0041	.0001	
16,000	16,000	.0043	.....	
17,000	17,000	.0046	.....	Elastic limit.
18,000	18,000	.0051	.....	
19,000	19,000	.0058	.....	
20,000	20,000	.0084	.....	
21,000	21,000	.0156	.....	
22,000	22,000	.0238	.....	
23,000	23,000	.0320	.....	
24,000	24,000	.0470	.....	
25,000	25,000	.0595	.....	
26,000	26,000	.0749	.....	
27,000	27,000	.0900	.....	
28,000	28,000	.1075	.....	
29,000	29,000	.1270	.....	
30,000	30,000	.1510	.....	
31,000	31,000	.17	.....	
32,000	32,000	.19	.....	
33,000	33,000	.22	.....	
34,000	34,000	.26	.....	
35,000	35,000	.30	.....	
36,000	36,000	.34	.....	
37,000	37,000	.39	.....	
38,000	38,000	.43	.....	
39,000	39,000	.49	.....	
40,000	40,000	.56	.....	
41,000	41,000	.63	.....	
42,000	42,000	.73	.....	
43,000	43,000	.87	.....	
44,000	44,000	1.07	.....	
44,500	44,500	1.35	.....	Tensile strength.
0	0	1.50	.....	=18.8 per cent.

Elongation of inch sections: ″.08, ″.10, ″.11, ″.16, ″.21, ″.25, ″.39*, ″.20.

Fractured 2″.25 from the neck, or 10″ from the end of the axle. Appearance, fibrous, seamy.

Diameter at fracture, ″.95. Area, .709 square inch.

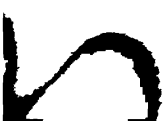
Contraction of area, 29.1 per cent.

At a distance of 7½″ from the end of the axle a small transverse crack opened, this crack being on the side of the specimen next the journal bearing. The dimensions of the crack were 2″ long, and opened about ″.00½ in width, its depth about ″.02.

The sides of the crack were dark-colored and comparatively smooth. This crack is thought to be part of the crack discovered in this journal before cutting up the axle for test specimens.

This fractured tensile specimen was bent cold 33 degrees with the above mentioned crack at the middle of the bend on the tension side, which opened the crack in width and also developed numerous cracks in this vicinity, the principal injury occurring ″.50 away from the dark-colored crack.

All other cracks developed had irregular surfaces, and exposed bright-colored metal.



No. 4187.

Marks, $\frac{M}{c}B_3$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In ganged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	0.	
16,000	16,000	.0043	.....	
17,000	17,000	.0046	.....	
18,000	18,000	.0050	.....	
19,000	19,000	.0055	.....	Elastic limit.
20,000	20,000	.0064	.....	
21,000	21,000	.0120	.....	
22,000	22,000	.0212	.....	
23,000	23,000	.0361	.....	
24,000	24,000	.0465	.....	
25,000	25,000	.0551	.....	
26,000	26,000	.0725	.....	
27,000	27,000	.0862	.....	
28,000	28,000	.1030	.....	
29,000	29,000	.1240	.....	
30,000	30,000	.1560	.....	
31,000	31,000	.19	.....	
32,000	32,000	.22	.....	
33,000	33,000	.25	.....	
34,000	34,000	.28	.....	
35,000	35,000	.31	.....	
36,000	36,000	.34	.....	
37,000	37,000	.38	.....	
38,000	38,000	.42	.....	
39,000	39,000	.48	.....	
40,000	40,000	.52	.....	
41,000	41,000	.60	.....	
42,000	42,000	.69	.....	
43,000	43,000	.80	.....	
44,000	44,000	.97	.....	
45,000	45,000	1.20	.....	
45,070	45,070	1.41	.....	Tensile strength.
0	0	1.70	.....	=21.3 per cent.

Elongation of inch sections: ″.09, ″.11, ″.13, ″.19, ″.26, ″.48*, ″.26, ″.18.

Fractured 4″ from the neck, or 8¾″ from the end of the axle. Appearance, fibrous, lamellar.

Diameter at fracture, ″.91. Area, .650 square inch. Contraction of area, 35 per cent.

SPECIMENS FROM AXLE NO. 9.

No. 4200.

Marks, $\frac{M\ B}{a}$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0013	0.	
10,000	10,000	.0026	.0002	
15,000	15,000	.0046	.0007	Elastic limit, approximate.
16,000	16,000	.0051	.....	
17,000	17,000	.0058	.0016	
18,000	18,000	.0069	.....	
19,000	19,000	.0078	.....	
20,000	20,000	.0092	.0041	
21,000	21,000	.0138	.....	
22,000	22,000	.0211	.....	
23,000	23,000	.0293	.....	
24,000	24,000	.0385	.....	
25,000	25,000	.0550	.....	
26,000	26,000	.0695	.....	
27,000	27,000	.0875	.....	
28,000	28,000	.1000	.....	
29,000	29,000	.1225	.....	
30,000	30,000	.1450	.....	
31,000	31,000	.17	.....	
32,000	32,000	.20	.....	
33,000	33,000	.23	.....	
34,000	34,000	.26	.....	
35,000	35,000	.29	.....	
36,000	36,000	.33	.....	
37,000	37,000	.38	.....	
38,000	38,000	.42	.....	
39,000	39,000	.48	.....	
40,000	40,000	.53	.....	
41,000	41,000	.61	.....	
42,000	42,000	.70	.....	
43,000	43,000	.81	.....	
44,000	44,000	.98	.....	
45,000	45,000	1.31	.....	Tensile strength.
0	0	1.60	.....	=20 per cent.

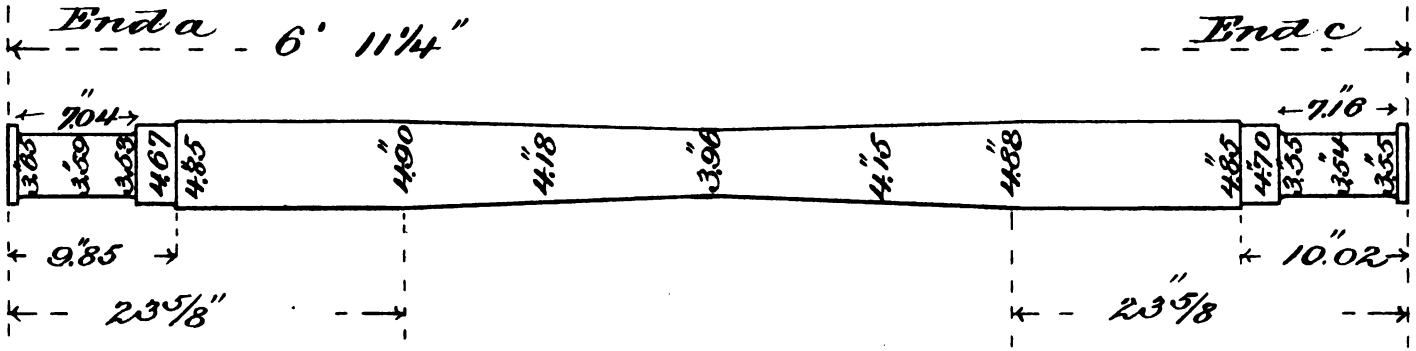
Elongation of inch sections: ″.11, ″.12, ″.14, ″.15, ″.44* ″.31 ″.20, ″.13.

Fractured 4″ from the neck, or 8″.4 from the end of the axle. Appearance, fibrous, lamellar.

Diameter at fracture, ″.91. Area, .650 square inch.

Contraction of area, 35 per cent.

Muck bar axle No. 9.



No. 4201.

Marks, $\frac{M\ B_6}{a}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	0.	
16,000	16,000	.0045	.....	
17,000	17,000	.0050	.....	
18,000	18,000	.0055	.....	Elastic limit.
19,000	19,000	.0063	.....	
20,000	20,000	.0077	.....	
21,000	21,000	.0090	.....	
22,000	22,000	.0155	.....	
23,000	23,000	.0225	.....	
24,000	24,000	.0332	.....	
25,000	25,000	.0460	.....	
26,000	26,000	.0578	.....	
27,000	27,000	.0698	.....	
28,000	28,000	.0857	.....	
29,000	29,000	.0947	.....	
30,000	30,000	.1242	.....	
31,000	31,000	.1450	.....	
32,000	32,000	.1715	.....	
33,000	33,000	.20	.....	
34,000	34,000	.22	.....	
35,000	35,000	.26	.....	
36,000	36,000	.30	.....	
37,000	37,000	.33	.....	
38,000	38,000	.38	.....	
39,000	39,000	.42	.....	
40,000	40,000	.49	.....	
41,000	41,000	.57	.....	
42,000	42,000	.67	.....	
43,000	43,000	.80	.....	
44,000	44,000	1.00	.....	Tensile strength.
0	0	1.14	.....	=14.3 per cent.

Elongation of inch sections, ″.09, ″.07, ″.08, ″.10, ″.17, ″.22, ″.25*, ″.26.

Fractured 1″.6 from the neck, or 9¾″ from the end of the axle. Appearance, fibrous and dull spongy 60 per cent., granular 40 per cent.

Diameter at fracture, 1″. Area, .785 square inch.

Contraction of area, 21.5 per cent.

Numerous cracks were developed in the cylindrical surface of the stem at a distance of 7½″ to 10½″ from the end of the axle.

No. 4202.

Marks, $\frac{M\ B}{a}$.
Diameter 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0010	0.	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	.0001	
16,000	16,000	.0045	.....	
17,000	17,000	.0048	.....	Elastic limit.
18,000	18,000	.0058	.....	
19,000	19,000	.0072	.....	
20,000	20,000	.0087	.....	
21,000	21,000	.0120	.....	
22,000	22,000	.0190	.....	
23,000	23,000	.0280	.....	
24,000	24,000	.0420	.....	
25,000	25,000	.0538	.....	
26,000	26,000	.0685	.....	
27,000	27,000	.0820	.....	
28,000	28,000	.0965	.....	
29,000	29,000	.1130	.....	
30,000	30,000	.1379	.....	
31,000	31,000	.1635	.....	
32,000	32,000	.19	.....	
33,000	33,000	.22	.....	
34,000	34,000	.24	.....	
35,000	35,000	.28	.....	
36,000	36,000	.32	.....	
37,000	37,000	.36	.....	
38,000	38,000	.40	.....	
39,000	39,000	.46	.....	
40,000	40,000	.53	.....	
41,000	41,000	.60	.....	
42,000	42,000	.68	.....	
43,000	43,000	.79	.....	
44,000	44,000	.97	.....	
45,000	45,000	1.28	.....	Tensile strength.
0	0	1.54	.....	= 19.3 per cent.

Elongation of inch sections: ″.15, ″.19, ″.31, ″38*, ″.15, ″.13, ″.11 12″.

Fractured 4″ from the neck, or 8½″ from the end of the axle. Appearance, fibrous .50 per cent., granular 50 per cent.

Diameter at fracture, ″.92. Area, .665 square inch.

Contraction of area, 33.5 per cent.

Cracks developed in the cylindrical surface of the stem at a distance of 7″ to 10½″ from the end of the axle.

No. 4203.

Marks, $\frac{M B_3}{b}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.....	
10,000	10,000	.0032	.....	
15,000	15,000	.0050	0.	
20,000	20,000	.0070	.....	
21,000	21,000	.0073	.....	
22,000	22,000	.0078	.....	
23,000	23,000	.0081	.....	Elastic limit.
24,000	24,000	.0092	.....	
25,000	25,000	.0104	.....	
26,000	26,000	.0129	.....	
27,000	27,000	.0180	.....	
28,000	28,000	.0325	.....	
29,000	29,000	.0510	.....	
30,000	30,000	.0745	.....	
31,000	31,000	.1015	.....	
32,000	32,000	.1325	.....	
33,000	33,000	.18	.....	
34,000	34,000	.20	.....	
35,000	35,000	.24	.....	
36,000	36,000	.28	.....	
37,000	37,000	.33	.....	
38,000	38,000	.39	.....	
39,000	39,000	.44	.....	
40,000	40,000	.50	.....	
42,000	42,000	.64	.....	
44,000	44,000	.90	.....	
45,940	45,940	.....	.....	Tensile strength.
0	0	1.72	.....	=17.2 per cent.

Elongation of inch sections: ″.53*, ″.21, ″.16, ″.14, ″.13, ″.13, ″.11, ″.09, ″.10, ″.12.
Diameter at fracture, ″.80. Area, .503 square inch.
Contraction of area, 49.7 per cent.
Appearance of fracture, fibrous.

No. 4204.

Marks, $\frac{M\ B}{b}$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0017	.....	
10,000	10,000	.0036	.0002	
15,000	15,000	.0052	.0002	
20,000	20,000	.0070	.0002	
21,000	21,000	.0075	.....	
22,000	22,000	.0079	.....	
23,000	23,000	.0082	.....	
24,000	24,000	.0088	.....	
25,000	25,000	.0092	.0008	Elastic limit.
26,000	26,000	.0100	.....	
27,000	27,000	.0151	.....	
28,000	28,000	.0248	.....	
29,000	29,000	.0402	.....	
30,000	30,000	.0540	.....	
31,000	31,000	.0712	.....	
32,000	32,000	.0950	.....	
33,000	33,000	.1170	.....	
34,000	34,000	.1490	.....	
35,000	35,000	.1825	.....	
36,000	36,000	.22	.....	
37,000	37,000	.27	.....	
38,000	38,000	.31	.....	
39,000	39,000	.37	.....	
40,000	40,000	.42	.....	
41,000	41,000	.48	.....	
42,000	42,000	.54	.....	
43,000	43,000	.64	.....	
44,000	44,000	.78	.....	
45,000	45,000	.91	.....	
46,000	46,000	1.16	.....	
46,490	46,490	1.41	.....	Tensile strength.
0	0	1.66	.....	=16.6 per cent.

Elongation of inch sections: ″.53*, ″.21, ″.19, ″.15, ″.14, ″.12, ″.09, ″.08, ″.07, ″.08.
Fractured 1″.6 from neck. Appearance, fibrous.
Diameter at fracture, ″.83. Area, .541 square inch.
Contraction of area, 45.9 per cent.

No. 4205.

Marks, $\frac{MB}{b}$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 12″.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0015	.....	
10,000	10,000	.0032	0.	
15,000	15,000	.0050	0.	
20,000	20,000	.0068	.0001	
21,000	21,000	.0072	.....	
22,000	22,000	.0076	.....	
23,000	23,000	.0081	.....	
24,000	24,000	.0084	.....	
25,000	25,000	.0088	.0006	Elastic limit.
26,000	26,000	.0097	.....	
27,000	27,000	.0120	.....	
28,000	28,000	.0198	.....	
29,000	29,000	.0340	.....	
30,000	30,000	.0575	.....	
31,000	31,000	.0780	.....	
32,000	32,000	.1025	.....	
33,000	33,000	.1380	.....	
34,000	34,000	.1720	.....	
35,000	35,000	.22	.....	
36,000	36,000	.26	.....	
37,000	37,000	.30	.....	
38,000	38,000	.34	.....	
39,000	39,000	.39	.....	
40,000	40,000	.47	.....	
41,000	41,000	.54	.....	
42,000	42,000	.62	.....	
43,000	43,000	.72	.....	
44,000	44,000	.88	.....	
45,000	45,000	1.03	.....	
46,260	46,260	1.57	.....	Tensile strength.
43,300	.....	.....	.....	At time of rupture.
0	.....	1.76	.....	=17.6 per cent.

Elongation of inch sections: ″.09, ″.09, ″.10, ″.12, ″.13, ″.16, ″.15, ″.18 ″.21, ″.53*.
Fractured 1″.70 from the neck. Appearance, fibrous.
Diameter at fracture, ″.83. Area, .541 square inch.
Contraction of area, 45.9 per cent.

No. 4206.

Marks, $^{M\ B}_{c}$
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	.....	
10,000	10,000	.0026	0.	
15,000	15,000	.0041	0.	
16,000	16,000	.0045	.....	
17,000	17,000	.0049	.....	
18,000	18,000	.0055	.....	Elastic limit.
19,000	19,000	.0065	.....	
20,000	20,000	.0084	.....	
21,000	21,000	.0110	.....	
22,000	22,000	.0172	.....	
23,000	23,000	.0285	.....	
24,000	24,000	.0412	.....	
25,000	25,000	.0515	.....	
26,000	26,000	.0651	.....	
27,000	27,000	.0780	.....	
28,000	28,000	.0965	.....	
29,000	29,000	.1185	.....	
30,000	30,000	.1360	.....	
31,000	31,000	.1625	.....	
32,000	32,000	.19	.....	
33,000	33,000	.22	.....	
34,000	34,000	.25	.....	
35,000	35,000	.28	.....	
36,000	36,000	.30	.....	
37,000	37,000	.34	.....	
38,000	38,000	.40	.....	
39,000	39,000	.44	.....	
40,000	40,000	.48	.....	
41,000	41,000	.54	.....	
42,000	42,000	.62	.....	
43,000	43,000	.70	.....	
44,000	44,000	.78	.....	
45,000	45,000	.98	.....	
46,000	46,000	1.21	.....	
46,670	46,670	1.57	.....	Tensile strength.
0	0	1.90	.....	= 23.8 per cent.

Elongation of inch sections: ″.14, ″.17, ″.17, ″.25, ″.57*, ″.26, ″.19, ″15.
Fractured near middle of stem, or 7⅝″ from the end of the axle.
Appearance, fibrous.
Diameter at fracture, ″.83. Area, .541 square inch.
Contraction of area, 45.9 per cent.

No. 4207.

Marks, $\frac{M\ B}{C}$.
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0012	.....	
10,000	10,000	.0025	0.	
15,000	15,000	.0040	.0001	
16,000	16,000	.0042	.....	
17,000	17,000	.0044	.....	
18,000	18,000	.0047	.....	
19,000	19,000	.0052	.....	Elastic limit.
20,000	20,000	.0062	.....	
21,000	21,000	.0095	.....	
22,000	22,000	.0160	.....	
23,000	23,000	.0330	.....	
24,000	24,000	.0522	.....	
25,000	25,000	.0685	.....	
26,000	26,000	.0855	.....	
27,000	27,000	.1020	.....	
28,000	28,000	.1242	.....	
29,000	29,000	.1430	.....	
30,000	30,000	.1725	.....	
31,000	31,000	.20	.....	
32,000	32,000	.22	.....	
33,000	33,000	.25	.....	
34,000	34,000	.28	.....	
35,000	35,000	.31	.....	
36,000	36,000	.36	.....	
37,000	37,000	.40	.....	
38,000	38,000	.44	.....	
39,000	39,000	.49	.....	
40,000	40,000	.55	.....	
41,000	41,000	.61	.....	
42,000	42,000	.70	.....	
43,000	43,000	.80	.....	
44,000	44,000	.93	.....	
45,000	45,000	1.13	.....	
45,810	45,810	1.56	.....	Tensile strength.
0	0	1.99	.....	=24.9 per cent.

Elongation of inch sections, ″.15, ″.22, ″.27, ″.65*, ″.24, ″.17, ″.15, ″.14.

Fractured 4″.25 from the neck, or 8″ from the end of the axle. Appearance fibrous.

Diameter at fracture, ″.80. Area, .503 square inch.

Contraction of area, 49.7 per cent.

No. 4208.

Marks, $\frac{M\,B}{C}$,
Diameter, 1″.129.
Sectional area, 1 square inch.
Gauged length, 8″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
1,000	1,000	0.	0.	Initial load.
5,000	5,000	.0011	0.	
10,000	10,000	.0026	.0001	
15,000	15,000	.0041	.0001	
16,000	16,000	.0043	.....	
17,000	17,000	.0046	.....	Elastic limit.
18,000	18,000	.0052	.....	
19,000	19,000	.0062	.....	
20,000	20,000	.0086	.....	
21,000	21,000	.0122	.....	
22,000	22,000	.0160	.....	
23,000	23,000	.0308	.....	
24,000	24,000	.0440	.....	
25,000	25,000	.0564	.....	
26,000	26,000	.0665	.....	
27,000	27,000	.0835	.....	
28,000	28,000	.0990	.....	
29,000	29,000	.1192	.....	
30,000	30,000	.1380	.....	
31,000	31,000	.1640	.....	
32,000	32,000	.19	.....	
33,000	33,000	.22	.....	
34,000	34,000	.25	.....	
35,000	35,000	.28	.....	
36,000	36,000	.31	.....	
37,000	37,000	.35	.....	
38,000	38,000	.40	.....	
39,000	39,000	.45	.....	
40,000	40,000	.51	.....	
41,000	41,000	.59	.....	
42,000	42,000	.66	.....	
43,000	43,000	.77	.....	
44,000	44,000	.99	.....	
45,000	45,000	1.09	.....	
45,730	45,730	1.50	.....	Tensile strength.
0	0	1.81	.....	= 22.6 per cent.

Elongation of inch sections, ″.12, ″.14, ″.14, ″.28, ″.52*, ″.23, ″.21, ″.17.

Fractured at middle of stem, or $7\frac{5}{8}$″ from the end of the axle. Appearance, fibrous.

Diameter at fracture, ″.85. Area, .567 square inch.

Contraction of area, 43.3 per cent.

TABULATION OF SPECIMENS FROM MUCK-BAR TENDER AXLES NOS. 7, 8, AND 9.

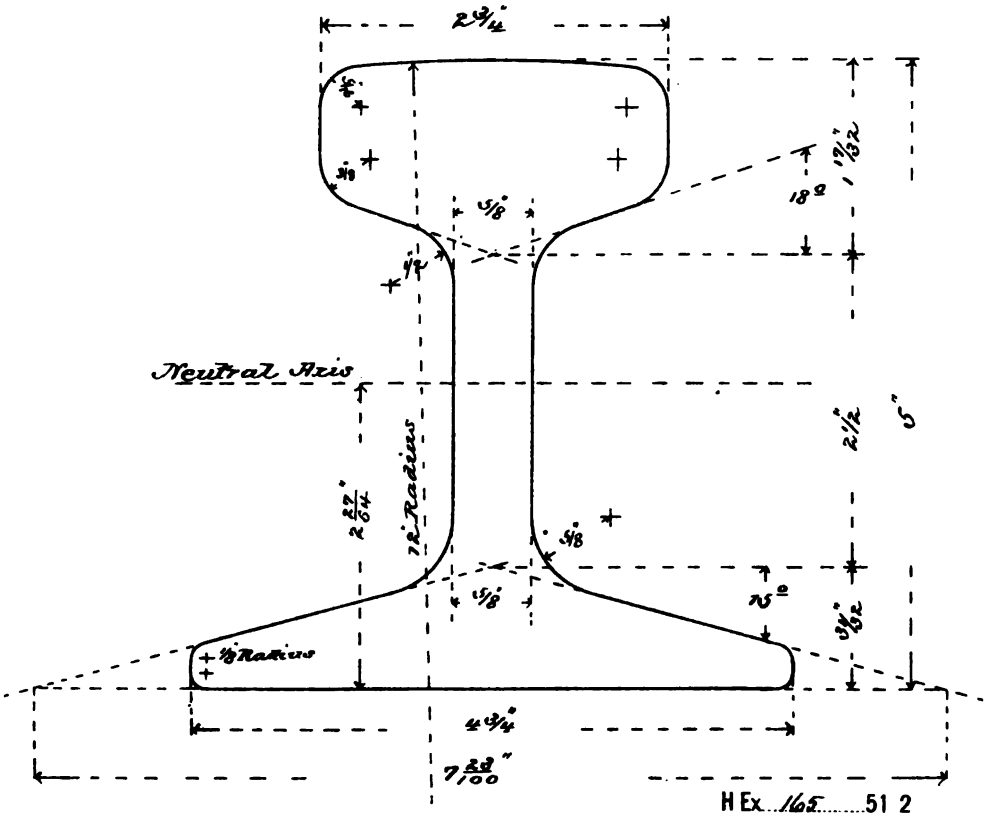
No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Inches.	*Sq. in.*	*Pounds.*	*Pounds.*	*Per ct.*	*" Sq. in.*	*Per ct.*		" " " " " " " " " "
4170	M B_7—*a*	1.129	1.00	19,000	45,790	28.5	Diam., .86=.581	41.9	Fibrous	.20, .24, .26, .40, .58*, .23, .19, .18
4171	...do	1.129	1.00	19,000	44,860	23.7	Diam., .85=.567	43.3	....do	.16, .17, .17, .23, .44*, .41*, .19, .13
4172	...do	1.129	1.00	17,000	45,000	21.7	Diam., .84=.554	44.6	....do	.15, .25, .60*, .28, .14, .12, .10, .10
4173	M B_7—*b*	1.129	1.00	23,000	45,420	24.6	Diam., .83=.541	45.9	Fibrous lamellar	.17, .17, .16, .17, .20, .29, .59*, .26, .22, .23
4174	...do	1.129	1.00	23,000	45,640	26.5	Diam., .81=.515	48.5	Fibrous	.18, .18, .20, .20, .23, .33, .60*, .28, .24, .21
4175	...do	1.129	1.00	23,000	45,880	27.3	Diam., .82=.528	47.2	Fibrous lamellar	.27, .23, .25, .28, .58*, .36, .21, .18, .18, .18
4176	M B_7—*c*	1.129	1.00	19,000	44,640	22.4	Diam., .86=.581	41.9	Fibrous seamy	.15, .18, .30, .59*, .19, .13, .14, .11
4177	...do ...	1.129	1.00	20,000	44,380	22.5	Diam., .84=.554	44.6	Fibrous	.13, .15, .19, .32, .51*, .20, .15, .15
4178	...do	1.129	1.00	16,000	44 060	21.6	Diam., .87=.594	40.6	Fibrous seamy	.13, .16, .19, .27, .57*, .17, .13, .11
4179	M B_8—*a*	1.129	1.00	18,000	45,000	21.4	Diam., .95=.709	29.1	Fibrous lamellar	.12, .15, .16, .19, .25, .23, .43*, .18
4180	...do	1.129	1.00	19,000	44,720	19.6	Diam., .91=.650	35.0	Fibrous seamy	.10, .11, .12, .15, .19, .21, .37*, .32*
4181	...do	1.129	1.00	20,000	43,880	13.0	Diam., .87=.594	29.4	Fibrous lamellar	.13, .35*, .13, .12, .10, .09, .07, .05
4182	M B_8—*b*	1.129	1.00	23,000	46,460	25.0	Diam., .82=.528	47.2	Fibrous	.17, .18, .22, .53*, .41, .23, .23, .20, .17, .16
4183	.. do	1.129	1.00	23,000	46,000	23.6	Diam., .83=.541	45.9	... do	.16, .19, .26, .60*, .28, .30, .18, .16, .16, .17
4184	...do	1.129	1.00	22,000	45,510	25.0	Diam., .83=.541	45.9	Fibrous seamy	.22, .25, .45*, .48*, .23, .18, .21, .17, .18, .13
4185	M B_8—*c*	1.129	1.00	19,000	44,870	22.9	Diam., .91=.650	35.0	....do	.19, .49*, .31, .28, .20, .13, .13, .10
4186	...do	1.129	1.00	17,000	44,500	18.8	Diam., .95=.709	29.1	....do	.08, .10, .11, .16, .21, .25, .39*, .20
4187	...do	1.129	1.00	19,000	45,070	21.3	Diam., .91=.650	35.0	Fibrous lamellar	.09, .11, .13, .19, .26, .48*, .26, .18
4200	M B_9—*a*	1.129	1.00	15,000	45,000	20.0	Diam., .91=.650	35.0	do	.11, .12, .14, .15, .44*, .31, .20, .13
4201	...do	1.129	1.00	18,000	44,000	14.3	Diam., 1.00=.785	21.5	Fibrous and dull spongy, 60 per cent.; granular, 40 per cent.	.09, .07, .08, .10, .17, .22, .25*, .26
4202	...do	1.129	1.00	17,000	45,000	19.3	Diam., .92=.665	33.5	Fibrous, 50 per cent.; granular, 50 per cent.	.15, .19, .31, .38*, .15, .13, .11, .12
4203	M B_9—*b*	1.129	1.00	22,000	45,940	17.2	Diam., .80=.503	49.7	Fibrous	.53*, .21, .16, .14, .13, .13, .11, .09, .10, .12
4204	...do	1.129	1.00	25,000	46,490	16.6	Diam., .83=.541	45.9	....do	.53*, .21, .19, .15, .14, 12, .09, .08, .07, .08
4205	...do	1.129	1.00	25,000	46,260	17.6	Diam., .83=.541	45.9	....do	.09, .09, .10, .12, .13, .16, .15, .15, .21, .53*
4206	M B_9—*c*	1.129	1.00	18,000	46,670	23.8	Diam., .83=.541	45.9	....do	.14, .17, .17, .25, .57*, .26, .19, .15
4207	...do	1.129	1.00	19,000	45,810	24.9	Diam., .80=.503	49.7	....do	.15, .22, .27, .65*, .24, .17, .15, .14
4208	...do	1.129	1.00	17,000	45,730	22.6	Diam., .85=.567	43.3	....do	.12, .14, .14, .28, .52*, .23, .21, .17

STEEL RAILS, TRANSVERSE TESTS,

AND

HARDNESS.

Delano Section



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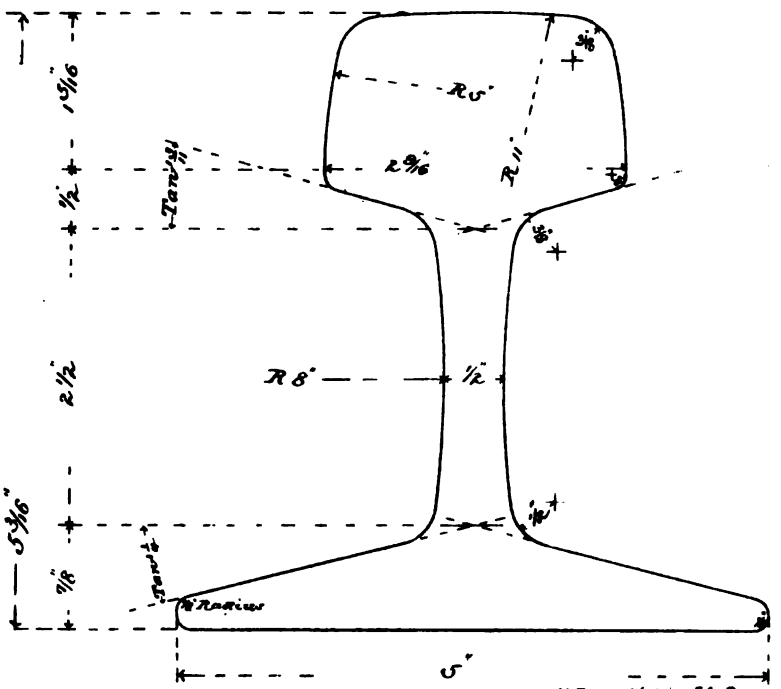
McClure Section



HEx 165 512

Eight samples of steel rails were contributed for test by Mr. F. A. Delano, of the C. B. and Q. R. R., Chicago, Ill., of which four samples were known as the Delano section and four samples as the McClure section, each of 85 pounds weight per yard.

The drawings illustrate the form and dimensions of the templates from which these sections were rolled.

The actual weight and height of each is recorded with the details of the transverse tests.

The transverse tests were made with the rail supported on end bearings 30 inches apart, to obtain good bearing surfaces for which, seats were planed on the base of the rail. Loads were applied at the middle of the length, using a plunger having $1\frac{1}{2}$ inches length of face.

Hardness determinations were made on the heads of the rails and also at different depths below the original surface. The metal was planed off different depths for the purpose of receiving the cut of the indenting tool used.

STEEL RAIL.

No. 53.

Delano section.
Weight, 85½ pounds per yard.
Height, 5″.02.
Marks, 5115.

Applied loads.	Deflection.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
4,000	.0032	.0032	.....	
6,000	.0058	.0026	.....	
8,000	.0078	.0020	.....	
10,000	.0099	.0021	.0013	
12,000	.0120	.0021	.....	
14,000	.0141	.0021	.....	
16,000	.0161	.0020	.....	
18,000	.0181	.0020	.....	
20,000	.0200	.0019	.0014	
22,000	.0220	.0020	.....	
24,000	.0240	.0020	.....	
26,000	.0259	.0019	.....	
28,000	.0278	.0019	.....	
30,000	.0297	.0019	.0016	
32,000	.0313	.0016	.....	
34,000	.0330	.0017	.....	
36,000	.0348	.0018	.....	
38,000	.0365	.0017	.....	
40,000	.0383	.0018	.0019	
42,000	.0400	.0017	.....	
44,000	.0419	.0019	.....	
46,000	.0438	.0019	.....	
48,000	.0455	.0017	.....	
50,000	.0473	.0018	.0020	
52,000	.0491	.0018	.....	
54,000	.0509	.0018	.....	
56,000	.0524	.0015	.....	
58,000	.0543	.0019	.....	
60,000	.0562	.0019	.0022	
62,000	.0582	.0020	.....	
64,000	.0600	.0018	.....	
66,000	.0618	.0018	.....	
68,000	.0636	.0018	.....	
70,000	.0655	.0019	.0030	
72,000	.0676	.0021	.....	
74,000	.0695	.0019	.....	
76,000	.0717	.0022	.....	
78,000	.0737	.0020	.....	
80,000	.0758	.0021	.0044	
82,000	.0782	.0024	.....	
84,000	.0804	.0022	.....	
86,000	.0829	.0025	.....	
88,000	.0852	.0023	.....	
90,000	.0880	.0028	.0076	
92,000	.0905	.0025	.....	
94,000	.0929	.0024	.....	
96,000	.0953	.0024	.....	
98,000	.0981	.0028	.....	
100,000	.1024	.0043	.0121	
102,000	.1048	.0024	.....	
104,000	.1080	.0032	.....	
106,000	.1105	.0025	.....	
108,000	.1134	.0029	.....	
110,000	.1180	.0046	.0199	
112,000	.1227	.0047	.....	Scale starts off in vicinity of middle bearing.
116,000	.1306	.0079	.....	
118,000	.1349	.0043	.....	
120,000	.1410	.0061	.0326	
122,000	.1500	.0090	.....	
124,000	.1562	.0062	.....	
126,000	.1665	.0103	.....	
128,000	.1824	.0159	.....	
130,000	.1973	.0149	.0782	Test discontinued.

STEEL RAIL.

No. 54.

McClure section.
Weight, 84¾ pounds per yard.
Height, 5″.17.
Mark, 5567.

Applied loads.	Deflections.	Successive deflections.	Deflection] sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
4,000	.0022	.0022	.....	
6,000	.0047	.0025	.....	
8,000	.0069	.0022	.....	
10,000	.0089	.0020	.0002	
12,000	.0110	.0021	.....	
14,000	.0130	.0020	.....	
16,000	.0149	.0019	.....	
18,000	.0167	.0018	.....	
20,000	.0186	.0019	.0004	
22,000	.0203	.0017	.....	
24,000	.0223	.0020	.....	
26,000	.0241	.0018	.....	
28,000	.0260	.0019	.....	
30,000	.0278	.0018	.0004	
32,000	.0294	.0016	.....	
34,000	.0310	.0016	.....	
36,000	.0329	.0019	.....	
38,000	.0347	.0018	.....	
40,000	.0366	.0019	.0006	
42,000	.0383	.0017	.....	
44,000	.0400	.0017	.....	
46,000	.0417	.0017	.....	
48,000	.0436	.0019	.....	
50,000	.0454	.0018	.0007	
52,000	.0471	.0017	.....	
54,000	.0490	.0019	.....	
56,000	.0508	.0018	.....	
58,000	.0525	.0017	.....	
60,000	.0543	.0018	.0010	
62,000	.0560	.0017	.....	
64,000	.0577	.0017	.....	
66,000	.0595	.0018	.....	
68,000	.0612	.0017	.....	
70,000	.0630	.0018	.0013	
72,000	.0651	.0021	.....	
74,000	.0670	.0019	.....	
76,000	.0690	.0020	.....	
78,000	.0708	.0018	.....	
80,000	.0726	.0018	.0021	
82,000	.0747	.0021	.....	
84,000	.0764	.0017	.....	
86,000	.0782	.0018	.....	
88,000	.0802	.0020	.....	
90,000	.0822	.0020	.0030	
92,000	.0847	.0025	.....	
94,000	.0865	.0018	.....	
96,000	.0876	.0011	.0030	
98,000	.0896	.0020	.....	
100,000	.0916	.0020	.0037	
102,000	.0939	.0023	.....	
104,000	.0961	.0022	.....	
106,000	.0982	.0021	.....	
108,000	.1010	.0028	.....	
110,000	.1039	.0029	.0068	
112,000	.1068	.0029	.....	
114,000	.1096	.0028	.....	Scale starts off in vicinity of middle bearing.
116,000	.1140	.0044	.....	
118,000	.1181	.0041	.....	
120,000	.1221	.0040	.0161	
122,000	.1300	.0079	.....	
124,000	.1363	.0063	.....	
126,000	.1453	.0090	.....	
128,000	.1580	.0127	.....	
130,000	.1743	.0163	.0578	Test discontinued.

STEEL RAIL.

No. 55.

Delano section.
Weight, 84¾ pounds per yard.
Height, 5″.02.
Mark, 5117.

Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
10,000	.0093	.....	.0003	
20,000	.0190	.....	.0003	
30,000	.0283	.....	.0005	
40,000	.0371	.....	.0006	
50,000	.0460	.....	.0008	
60,000	.0550	.....	.0008	
70,000	.0636	.....	.0009	
80,000	.0725	.....	.0012	
82,000	.0745	.0020	.....	
84,000	.0765	.0020	.....	
86,000	.0782	.0017	.....	
88,000	.0800	.0018	.....	
90,000	.0821	.0021	.0020	
92,000	.0840	.0019	.....	
94,000	.0860	.0020	.....	
96,000	.0880	.0020	.....	
98,000	.0900	.0020	.....	
100,000	.0922	.0022	.0035	
102,000	.0944	.0022	.....	
104,000	.0964	.0020	.....	
106,000	.0987	.0023	.....	
108,000	.1009	.0022	.....	
110,000	.1033	.0024	.0052	
112,000	.1060	.0027	.....	
114,000	.1083	.0023	.....	
116,000	.1109	.0026	.....	
118,000	.1133	.0024	.....	Scale starts off.
120,000	.1170	.0037	.0099	
122,000	.1202	.0032	.....	
124,000	.1230	.0028	.....	
126,000	.1260	.0030	.....	
128,000	.1302	.0042	.....	
130,000	.1358	.0056	.0190	
132,000	.1433	.0075	.....	
134,000	.1502	.0069	.....	
136,000	.1620	.0118	.....	
138,000	.1750	.0130	.....	
140,000	.1895	.0145	.0618	Test discontinued.

STEEL RAIL.

No. 56.

McClure section.
Weight, 84¼ pounds per yard.
Height, 5″.18.
Mark, 5621.

Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
10,000	.0091	.....	.0003	
20,000	.0190	.....	.....	
30,000	.0283	.....	.....	
40,000	.0370	.....	.0007	
50,000	.0462	.....	.....	
60,000	.0554	.....	.....	
70,000	.0660	.....	.....	
80,000	.0767	.....	.0052	
82,000	.0793	.0026	.....	
84,000	.0817	.0024	.....	
86,000	.0843	.0026	.....	
88,000	.0869	.0026	.....	
90,000	.0900	.0031	.0099	
92,000	.0931	.0031	.....	
94,000	.0958	.0027	.....	
96,000	.0988	.0030	.....	
98,000	.1020	.0032	.....	
100,000	.1054	.0034	.0162	
102,000	.1097	.0043	.....	
104,000	.1130	.0033	.....	
106,000	.1178	.0048	.....	Scale starts off.
108,000	.1223	.0045	.....	
110,000	.1285	.0062	.0298	
112,000	.1355	.0070	.....	
114,000	.1430	.0075	.....	
116,000	.1578	.0148	.....	
118,000	.1726	.0148	.....	
120,000	.1950	.0224	.0850	Test discontinued.

STEEL RAIL.

No. 57.

Delano section.
Weight, 81.72 pounds per yard.
Height, 4″.99.
Mark, 5068.

Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
10,000	.0094	.....	.0002	
20,000	.0197	.....	.....	
30,000	.0290	.....	.....	
40,000	.0384	.....	.0006	
50,000	.0474	.....	.....	
60,000	.0568	.....	.....	
70,000	.0663	.....	.....	
80,000	.0760	.....	.0011	
90,000	.0870	.....	.0037	
92,000	.0894	.0024	.....	
94,000	.0918	.0024	.....	
96,000	.0944	.0026	.....	
98,000	.0972	.0028	.....	
100,000	.0995	.0023	.0067	
102,000	.1025	.0030	.....	
104,000	.1051	.0026	.....	
106,000	.1085	.0034	.....	
108,000	.1120	.0035	.....	
110,000	.1168	.0048	.0140	
112,000	.1213	.0045	.....	
114,000	.1268	.0055	.....	Scale starts off.
116,000	.1340	.0072	.....	
118,000	.1433	.0093	.....	
120,000	.1547	.0114	.0412	
122,000	.1680	.0133	.....	
124,000	.1821	.0141	.....	
126,000	.1992	.0171	.....	
128,000	.2126	.0134	.....	
130,000	.2338	.0212	.1077	Test discontinued.

STEEL RAIL.

No. 58.

McClure section.
Weight, 83½ pounds per yard.
Height, 5″.18.
Mark, 5602.

Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
10,000	.0093	.....	.0004	
20,000	.0193	.....	.....	
30,000	.0289	.....	.....	
40,000	.0379	.....	.0008	
50,000	.0470	.....	.....	
60,000	.0560	.....	.....	
70,000	.0650	.....	.....	
80,000	.0735	.....	.0011	
90,000	.0833	.....	.0026	
92,000	.0851	.0028	.....	
94,000	.0871	.0020	.....	
96,000	.0891	.0020	.....	
98,000	.0912	.0021	.....	
100,000	.0933	.0021	.0038	
102,000	.0957	.0024	.....	
104,000	.0979	.0022	.....	
106,000	.1002	.0023	.....	
108,000	.1024	.0022	.....	
110,000	.1050	.0026	.0062	
112,000	.1077	.0027	.....	
114,000	.1100	.0023	.....	
116,000	.1127	.0027	.....	Scale starts off.
118,000	.1157	.0030	.....	
120,000	.1188	.0031	.0108	
122,000	.1223	.0035	.....	
124,000	.1259	.0036	.....	
126,000	.1323	.0064	.....	
128,000	.1428	.0105	.....	
130,000	.1540	.0112	.0360	
132,000	.1695	.0155	.....	
134,000	.1942	.0247	.....	
136,000	.2050	.0108	.....	
138,000	.2125	.0075	.....	
140,000	.2360	.0235	.....	
.....	.2478	.0118	.....	After 5 minutes.
.....	.2530	.0042	.1285	After 10 minutes.
.....	.....	.....	.....	Test discontinued.

STEEL RAIL.

No. 59.

Delano section.
Weight, 81 pounds per yard.
Height, 5″.
Marks, 5071.

Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
10,000	.0034	.....	.0004	
20,000	.0193	.....	.....	
30,000	.0288	.....	.....	
40,000	.0381	.....	.0007	
50,000	.0472	.....	.....	
60,000	.0563	.....	.....	
70,000	.0655	.....	.....	
80,000	.0751	.....	.0014	
90,000	.0850	.....	.0022	
92,000	.0873	.0023	.....	
94,000	.0892	.0019	.....	
96,000	.0912	.0020	.....	
98,000	.0940	.0028	.....	
100,000	.0960	.0020	.0040	
102,000	.0983	.0023	.....	
104,000	.1008	.0025	.....	
106,000	.1034	.0026	.....	
108,000	.1060	.0026	.....	
110,000	.1089	.0029	.0074	
112,000	.1123	.0034	.....	
114,000	.1150	.0027	.....	
116,000	.1184	.0034	.....	
118,000	.1225	.0041	.....	Scale starts off.
120,000	.1275	.0050	.0164	
122,000	.1370	.0095	.....	
124,000	.1460	.0090	.....	
126,000	.1607	.0147	.....	
128,000	.1743	.0136	.....	
130,000	.1925	.0182	.0603	Test discontinued.

STEEL RAIL.

No. 60.

McClure section.
Weight, 82.08 pounds per yard.
Height, 5″.18.
Marks, 5642.

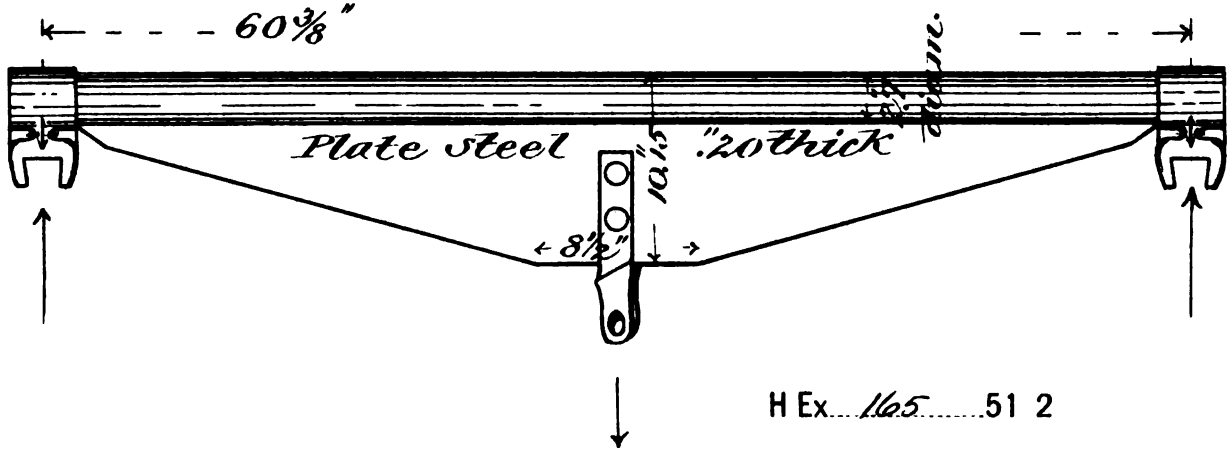
Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
2,000	0.	0.	0.	Initial load.
10,000	.0093	.....	.0003	
20,000	.0190	.....	.....	
30,000	.0282	.....	.....	
40,000	.0378	.....	.0005	
50,000	.0464	.....	.....	
60,000	.0549	.....	.....	
70,000	.0642	.....	.....	
80,000	.0737	.....	.0019	
90,000	.0833	.....	.0031	
92,000	.0858	.0025	.....	
94,000	.0880	.0022	.....	
96,000	.0900	.0020	.....	
98,000	.0921	.0021	.....	
100,000	.0946	.0025	.0051	
102,000	.0976	.0030	.....	
104,000	.0998	.0022	.....	
106,000	.1020	.0022	.....	
108,000	.1048	.0028	.....	
110,000	.1077	.0029	.0089	
112,000	.1109	.0032	.....	
114,000	.1138	.0029	.....	
116,000	.1165	.0027	.....	
118,000	.1198	.0033	.....	
120,000	.1240	.0042	.0158	Scale starts off.
122,000	.1284	.0044	.....	
124,000	.1322	.0038	.....	
126,000	.1370	.0048	.....	
128,000	.1430	.0060	.....	
130,000	.1524	.0094	.0343	
132,000	.1640	.0116	.....	
134,000	.1740	.0100	.....	
136,000	.1850	.0110	.....	
138,000	.2040	.0190	.....	
140,000	.2197	.0157	.0899	Test discontinued.

HARDNESS OF STEEL RAILS.

Transverse test number.	Mark.	Location of cut.	Hardness.
53	5115	Original surface of head, one end	25.73
		Original surface of head, other end	24.28*
54	5567	Original surface of head, one end	21.17
		Original surface of head, other end	22.64
55	5117	Original surface of head, one end	26.99
		Original surface of head, other end	26.99
56	5621	Original surface of head, one end	21.64
		Original surface of head, other end	21.64
57	5068	Original surface of head, one end	21.64
		Original surface of head, other end	22.39
58	5662	Original surface of head, one end	21.40
		Original surface of head, other end	21.17
59	5071	Original surface of head, one end	21.17
		¼" below original surface	25.73
		½" below original surface	24.83
		¾" below original surface	25.13
		Original surface of head, other end	21.64
		¼" below original surface	26.67
		½" below original surface	25.13
		¾" below original surface	25.43
60	5642	Original surface of head, one end	26.99
		¼" below original surface	25.73
		½" below original surface	25.13
		¾" below original surface	25.13
		Original surface of head, other end	26.67
		¼" below original surface	25.13
		½" below original surface	24.26
		¾" below original surface	25.13

* Defective cut.

Sketch of Brake Beam.
No. 4290



H Ex. 165 51 2

RAILWAY BRAKE-BEAM.

No. 4290.

TRANSVERSE TEST.

Weight of beam, including shoe-seat castings and brake-rod connection, 82 pounds.

Beam supported at ends on oak blocks resting against shoe castings.

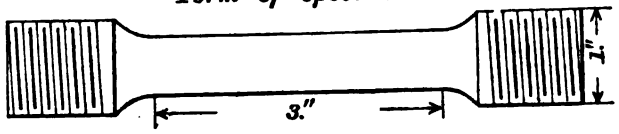
Loaded at the middle, pulling against brake-rod connections.

Applied loads.	Deflections.	Successive deflections.	Deflection sets.	Remarks.
Pounds.	*Inch.*	*Inch.*	*Inch.*	
500	0.	0.	0.	Initial load.
1,000	.0038	.0038	.....	
2,000	.0098	.0060	.....	
3,000	.0158	.0060	.....	
4,000	.0225	.0067	.....	
5,000	.0310	.0085	.....	
6,000	.0393	.0083	.....	
7,000	.0435	.0042	.....	
8,000	.0502	.0067	.....	
9,000	.0557	.0055	.....	
10,000	.0628	.0071	.....	
11,000	.0681	.0053	.....	
12,000	.0741	.0060	.....	
13,000	.0808	.0067	.....	
14,000	.0880	.0072	.....	Snapping sounds.
15,000	.0932	.0052	.....	
16,000	.1003	.0071	.....	
17,000	.1049	.0046	.....	
18,000	.1106	.0057	.....	
19,000	.1170	.0064	.....	
20,000	.1230	.0060	.....	
21,000	.1305	.0075	.....	
22,000	.1363	.0058	.....	
23,000	.1453	.0090	.....	
24,000	.1505	.0052	.....	
25,000	.1552	.0047	.....	
26,000	.1625	.0073	.....	Snapping sounds repeated.
27,000	.1696	.0071	.....	
28,000	.1778	.0082	.....	
29,000	.1858	.0080	.....	
30,000	.1927	.0069	.0176	
31,000	.2005	.0078	.....	
32,000	.2065	.0060	.....	
33,000	.2172	.0107	.....	
34,000	.2261	.0089	.....	
35,000	.2383	.0122	.....	
36,000	.2488	.0105	.....	
37,000	.2630	.0142	.....	
38,000	.2800	.0170	.....	
39,000	.2993	.0193	.....	
40,000	.3180	.0187	.0834	
43,500	.....	.....	.....	Ultimate strength.

Fractured the brake-rod connection at the bottom of the forked part spanning the beam web.

TENSILE TESTS OF STEEL FOR 5-INCH SIEGE CARRIAGES.

Form of specimens.



No. of test.	Mark on specimen.	Dimensions.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1-inch sections.
				Total.	Per square inch.	Total.	Per square inch.						
		Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Pr. ct.*	*" Sq. in.*	*Pr. ct.*		*" " "*
4341	P R ..	Diam., .564	.25	10,860	43,440	17,630	70,520	.28	9.3	Diam., .54=.229	8.4	Fine granular, with irregular shaped dull spot near center.	.10*, .09, .09
4342	P	Diam., .564	.25	8,610	34,440	14,270	57,080	.75	25.0	Diam., .38=.113	54.6	Silky	.48*, .17, .12
4343	B	Diam., .564	.25	9,280	37,120	14,090	56,360	1.03	34.3	Diam., .23=.086	65.6	....do	.23, *.57, .33
4344	O B ..	Diam., .564	.25	13,870	55,480	16,280	65,120	.89	29.7	Diam., .35=.096	61.5	....do	.17, *.48, .24

TENSILE TESTS OF STEEL REPRESENTING MATERIAL FOR USE IN 5-INCH SIEGE CARRIAGE.

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1-inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
		Inch.	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*In.*	*Pr. ct.*	" " *Sq. in.*	*Pr. ct.*		" " " " " " " "
3365	4924*a*	1.020	.498	.508	16,740	32,950	26,820	52,790	2.13	26.6	.84×.26=.218	57.1	Silky	.29, .61*, .29, .24, .19, .19, .17, .15
3366	4924*a*	1.010	.496	.501	16,680	33,290	27,100	54,090	2.26	28.2	.81×.26=.211	57.9	....do	.19, .23, .26, .58*, .33, .26, .20, .21
3367	4924*b*	1.006	.497	.500	17,100	34,200	28,210	56,420	1.30	16.3	.84×.34=.286	42.8	Silky, lamellar	.23, .14, .14, .16, .13, .16, .15, .19
3368	4995*a*	1.024	.498	.510	18,340	35,960	27,490	53,900	2.06	25.7	.77×.23=.177	65.3	....do	.17, .19, .19, .18, .27, .64*, .22, .30
3369	4995*a*	1.014	.498	.505	17,560	34,770	26,880	53,230	1.83	22.9	.83×.34=.282	44.2	....do	.17, .16, .20, .27, .45*, .21, .20, .17
3370	4995*b*	1.016	.496	.504	17,600	34,920	28,330	56,190	2.00	25.0	.80×.34=.272	46.0	....do	.44*, .31, .21, .20, .17, .22, .21, .24
									Elongation in 3 inches.					
3757	A 1	.564	Diam.	.25	9,310	37,240	16,280	65,120	.95	31.7	.35 diam.=.0962	61.5	Fine, silky	.20, .44*, .31
3758	A 1	.564	...do ..	.25	9,390	37,560	16,200	64,800	.90	30.0	.35 diam.=.0962	61.5	....do	.18, .50*, .22
3759	C 2	.564	...do ..	.25	7,210	28,840	15,430	61,720	.90	30.0	.40 diam.=.1257	49.7	Silky	.21, .50*, .19
3760	C 2	.564	...do ..	.25	7,720	30,880	15,620	62,480	.79	26.3	.42 diam.=.1385	44.6	Silky; opened cracks in surface of stem in vicinity of fracture.	.18, .42*, .19
									Elongation in 8 inches.					
3761	.....	1.017	.4985	.507	18,350	36,190	31,920	62,960	1.90	23.7	.74×.33=.244	51.9	Silky, slightly lamellar	.12, .17, .18, .18, .23, .47*, .38, .17
3762	.....	1.013	.2500	.253	12,080	47,750	16,760	66,250	1.59	19.9	.81×.15=.122	51.8	Silky	.16, .24, .42*, .17, .15, .15, .16, .14
3795	5073	1.490	.499	.744	28,850	38,780	48,960	65,810	2.08	26.0	1.12×.35=.392	47.3	Silky	.21, .60*, .22, .24, .22, .23, .21, .15
3796	5073	1.487	.496	.738	27,510	37,280	46,020	62,360	2.13	26.6	1.10×.32=.352	52.2	... do	.16, .32, .62*, .23, .21, .21, .22, .16
3797	5073+	1.486	.510	.758	27,020	35,650	49,880	65,800	2.20	27.5	1.24×.41=.508	33.0	Silky, lamellar, had a stratified appearance.	.18, .28, .44*, .35, .23, .29, .28, .15

a Lengthwise. *b* Crosswise.

TENSILE TESTS OF STEEL PLATE FROM METAL FOR 5-INCH SIEGE CARRIAGE

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.					
		Inches.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	*" " Sq. in.*	*Per ct.*	
4339	S S	1.00	.522	.522	.....	.....	36,620	70,150	.....	.....	.82×.34=.279	46.5	Silky.
4340	S S	1.00	.505	.505	.....	.....	34,020	67,370	.....	.....	.82×.33=.271	46.3	Silky; contains a seam ".3 across.
4348	B	2.00	.507	1.01	40,650	40,250	67,180	66,510	1.77	22.8	1.66×.40=.664	34.3	Silky, lamellar.
4349	B	2.00	.501	1.00	38,500	38,500	64,360	64,360	2.00	25.0	1.60×.37=.592	40.8	Do.
4350	B P	2.00	.257	.514	30,720	59,770	40,110	78,040	1.17	14.6	1.74×.18=.313	39.1	Do.
4351	B A P C	2.00	.452	.904	36,400	40,270	56,520	62,520	2.10	26.3	1.54×.31=.477	47.2	Do.
4352	B A P L	2.00	.441	.852	34,230	39,600	54,300	61,560	2.30	28.8	1.50×.28=.420	52.4	Do.
4353	T A P C	1.98	.251	.497	25,760	51,830	35,450	71,330	1.17*	14.6	1.64×.17=.279	43.9	Do.
4354	T A P L	2.00	.255	.510	26,580	52,120	34,890	68,410	1.43	17.9	1.77×.17=.301	41.0	Do.

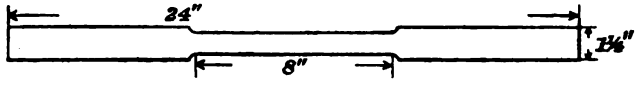
* Fractured outside the 8" gauged section.

WROUGHT IRON FOR 5-INCH SIEGE GUN CARRIAGE.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit.		Tensile strength.		Fracture.
				Total.	Per square inch.	Total.	Per square inch.	
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
2964	I	.564	.25	7,300	29,200	12,910	51,640	Fibrous.
2965	S	.564	.25	8,410	33,640	13,280	53,120	Do.

TENSILE TESTS OF SPECIMENS FROM CHEEK PLATES FOR 7-INCH SIEGE CARRIAGE.

Form of Specimens.



No. of test.	How taken.	Dimensions.		Sectional area.	Elastic limit.		Tensile strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
		Inch.	*Inch.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	" " *Sq. in.*	*Per ct.*		" " " " " " " "
3879	Lengthwise.	1.000	.515	.515	19,320	37,510	33,170	64,410	1.93	24.1	.75×.36=.270	47.6	Silky ...	.16, .23, .57*, .24, .21, .20, .18, .14
3880	....do	1.000	.508	.508	19,510	38,410	33,080	65,120	2.17	27.1	.75×.35=.263	48.2	...do	.14, .21, .55*, .26, .26, .32, .25, .18
3881	Crosswise ..	1.000	.498	.498	18,300	36,750	31,590	63,430	1.97	24.6	.71×.32=.227	54.4	...do	.16, .18, .20, .37*, .47*, .22, .20, .17
3882	....do	1.000	.507	.507	20,150	39,740	34,460	67,970	1.92	24.1	.71×.34=.241	52.5	...do	.17, .16, .17, .18, .22, .37* .47*, .18

STEEL BARS

FROM

ORDNANCE OFFICE, WASHINGTON, D. C.

807

SPECIMENS TURNED DOWN FROM BARS ".95 SQUARE.

No. 4653.

Mark, 1.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000250	.000150	.....	.....	
5,000	20,000	.000500	.000250	.....	.....	
7,500	30,000	.000850	.000350	.....	.....	
10,000	40,000	.001200	.000350	0.	.....	
11,250	45,000	.001400	.000200	.....	.....	
12,500	50,000	.001550	.000150	.....	.....	
13,750	55,000	.001800	.000250	.....	.....	
15,000	60,000	.001950	.000150	0.	.....	
15,500	62,000	.002000	.000050	.....	.....	
16,000	64,000	.002050	.000050	.....	.....	
16,500	66,000	.002100	.000050	.....	.....	
17,000	68,000	.002150	.000050	.....	.....	
17,500	70,000	.002250	.000100	.....	.....	
18,000	72,000	.002350	.000100	.....	.....	
18,500	74,000	.002400	.000050	.....	.....	
19,000	76,000	.002500	.000100	.....	.....	
19,500	78,000	.002550	.000050	.....	.....	
20,000	80,000	.002600	.000050	.....	.....	
20,500	82,000	.002650	.000050	.....	.....	
21,000	84,000	.002800	.000150	.....	.....	
21,500	86,000	.002900	.000100	.....	.....	
22,000	88,000	.002950	.000050	.....	.....	
22,500	90,000	.003000	.000050	.....	.....	
23,000	92,000	.003050	.000050	.....	.....	
23,500	94,000	.003100	.000050	.....	.....	
24,000	96,000	.003150	.000050	.....	.....	
24,500	98,000	.003200	.000050	.....	.....	
25,000	100,000	.003250	.000050	0.	.....	
25,500	102,000	.003400	.000150	.....	.....	
26,000	104,000	.003450	.000050	.....	.....	
26,500	106,000	.003500	.000050	.....	.....	
27,000	108,000	.003550	.000050	.....	.....	
27,500	110,000	.003750	.000200	.....	.....	
28,000	112,000	.003950	.000200	.000050	.000050	
28,500	114,000	.004050	.000100	.....	.....	
29,000	116,000	.004300	.000250	.....	.....	
29,500	118,000	.004400	.000100	.....	.....	Elastic limit.
30,000	120,000	.004850	.000450	.000550	.000500	
33,140	132,560	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.. 132,560
Elastic limit per square inch of original section	do... 118,000
Elongation per inch after rupture	Inappreciable
Elongation per inch under strain at elastic limit	inch... .00440
Reduction in diameter at point of rupture	Inappreciable
Reduction in area after rupture, per centum of original section	Inappreciable
Position of rupture	".6 from neck
Character of broken surface	fine granular

No. 4054.

Marks, 2.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000350	.000250			
5,000	20,000	.000600	.000250			
7,500	30,000	.000950	.000350			
10,000	40,000	.001300	.000350			
12,500	50,000	.001600	.000300			
13,750	55,000	.001800	.000200			
15,000	60,000	.001950	.000150	0.		
15,500	62,000	.002000	.000050			
16,000	64,000	.002050	.000050			
16,500	66,000	.002100	.000050			
17,000	68,000	.002150	.000050			
17,500	70,000	.002300	.000150			
18,000	72,000	.002350	.000050			
18,500	74,000	.002400	.000050			
19,000	76,000	.002500	.000100			
19,500	78,000	.002550	.000050			
20,000	80,000	.002600	.000050			
20,500	82,000	.002650	.000050			
21,000	84,000	.002750	.000100			
21,500	86,000	.002850	.000100			
22,000	88,000	.002900	.000050			
22,500	90,000	.002950	.000050			
23,000	92,000	.003000	.000050			
23,500	94,000	.003050	.000050			
24,000	96,000	.003100	.000050			
24,500	98,000	.003200	.000100			
25,000	100,000	.003350	.000150	.000050	.000050	
25,500	102,000	.003350	0.			
26,000	104,000	.003400	.000050			
26,500	106,000	.003450	.000050			
27,000	108,000	.003600	.000150			Elastic limit.
27,500	110,000	.004900	.001300	.001250	.001200	
42,100	168,400					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	168,400
Elastic limit per square inch of original section	do ..	108,000
Elongation per inch after rupture	inch..	.640
Elongation per inch under strain at elastic limit	do...	.003600
Reduction in diameter at point of rupture	do...	.014
Reduction in area after rupture, per centum of original section		5.0
Position of rupture		".70 from neck
Character of broken surface		granular, flaky

STEEL SPECIMENS

FROM

MIDVALE STEEL COMPANY.

Tests for comparison of testing machines.

811

No. 3918.

Marks, M D V S T N D.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000300	.000175	.....	.....	
3,750	15,000	.000425	.000125	.....	.....	
5,000	20,000	.000550	.000125	.....	.....	
6,250	25,000	.000700	.000150	.....	.....	
7,500	30,000	.000900	.000200	.....	.....	
8,750	35,000	.001075	.000175	.....	.....	
10,000	40,000	.001225	.000150	.....	.....	
11,250	45,000	.001400	.000175	.....	.....	
12,500	50,000	.001575	.000175	.....	.....	

No. 3919.

Marks, M D V S T N D.
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000125	.000125	0.	.....	
2,500	10,000	.000275	.000150	.....	.....	
3,750	15,000	.000400	.000125	.....	.....	
5,000	20,000	.000550	.000150	.....	.....	
6,250	25,000	.000675	.000125	.....	.....	
7,500	30,000	.000875	.000200	.....	.....	
8,750	35,000	.001025	.000150	.....	.....	
10,000	40,000	.001200	.000175	.....	.....	
11,250	45,000	.001375	.000175	.....	.....	
12,500	50,000	.001550	.000175	0.	.....	

No. 3920.

Marks, M D V S T N D.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000233	.000133	.....	.....	
3,750	15,000	.000433	.000200	.....	.....	
5,000	20,000	.000600	.000167	.....	.....	
6,250	25,000	.000767	.000167	.....	.....	
7,500	30,000	.000933	.000166	.....	.....	
8,750	35,000	.001100	.000167	.....	.....	
10,000	40,000	.001267	.000167	.....	.....	
11,250	45,000	.001433	.000166	.....	.....	
12,500	50,000	.001600	.000167	0.	.....	

No. 3921.

Marks, M D V S T N D.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

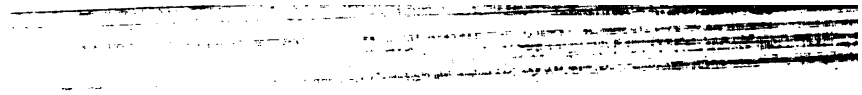
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
3,750	15,000	.000433	.000166	.....	.....	
5,000	20,000	.000600	.000167	.....	.....	
6,250	25,000	.000767	.000167	.....	.....	
7,500	30,000	.000933	.000166	.....	.....	
8,750	35,000	.001100	.000167	.....	.....	
10,000	40,000	.001267	.000167	.....	.....	
11,250	45,000	.001433	.000166	.....	.....	
12,500	50,000	.001600	.000167	0.	.....	

STEEL SPECIMENS

TAKEN FROM

THREE BARS OF STEEL FURNISHED BY THE BETHLEHEM IRON COMPANY, SOUTH BETHLEHEM, PA.

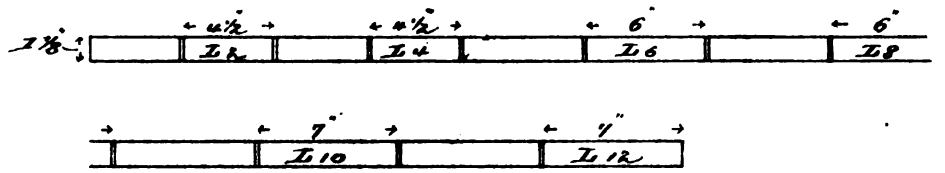
Alternate specimens tested at South Bethlehem, Pa.



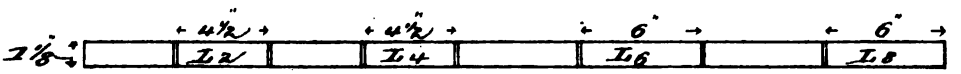
Location of specimens in bars

Bar No. 1

Bar No. 2



Bar No. 3



HEx 165 51 2

No. 3944.

Marks, $\frac{C\ T_1}{L_2}$
Diameters: End, ".5054; middle, ".5046; end, ".5052.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	0.	.....	
5,000	25,000	.000750	.000150	.....	.....	
6,000	30,000	.000950	.000200	0.	.....	
6,200	31,000	.001000	.000050	.....	.....	
6,400	32,000	.001050	.000050	.....	.....	
6,600	33,000	.001100	.000050	.....	.....	
6,800	34,000	.001100	0.	.....	.....	
7,000	35,000	.001150	.000050	0.	.....	
7,200	36,000	.001200	.000050	.....	.....	
7,400	37,000	.001250	.000050	.....	.....	
7,600	38,000	.001300	.000050	.....	.....	
7,800	39,000	.001350	.000050	.....	.....	
8,000	40,000	.001350	0.	.....	.....	
8,200	41,000	.001400	.000050	.....	.....	
8,400	42,000	.001450	.000050	.....	.....	
8,600	43,000	.001450	0.	.....	.....	
8,800	44,000	.001500	.000050	.....	.....	
9,000	45,000	.001600 .002250	.000100 .010750	.....	.....	Elastic limit.
9,200	46,000	.012750	.000400	.....	.....	
9,400	47,000	.012350	.000600	.....	.....	
9,600	48,000	.014400	.001050	.....	.....	
10,000	50,000	.016450	.001050	.....	.....	
10,400	52,000	.018950	.002500	.....	.....	
10,800	54,000	.021250	.002300	.....	.....	
11,200	56,000	.023950	.002700	.....	.....	
11,600	58,000	.027150	.003200	.....	.....	
12,000	60,000	.030500	.003350	.....	.....	
12,400	62,000	.033900	.003400	.....	.....	
12,800	64,000	.038150	.004250	.....	.....	
13,200	66,000	.041950	.003800	.....	.....	
13,600	68,000	.047350	.005400	.....	.....	
14,000	70,000	.055100	.007750	.....	.....	
14,400	72,000	.0575	.0024	.....	.....	
14,800	74,000	.0700	.0125	.....	.....	
15,200	76,000	.0800	.0100	.....	.....	
15,600	78,000	.1000	.0200	.....	.....	
16,000	80,000	.1200	.0200	.....	.....	
16,290	81,950	.1950	.0750	.....	.....	Tensile strength.
13,580	.....	.....	.....	.....	.....	At time of rupture.

General summary.

Tensile strength per square inch of original section	pounds..	81,950
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.3050
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per centum of original section		49.1
Position of rupture		1".15 from neck
Character of broken surface		fine silky
Elongation of inch sections		".41", ".20

No. 3945.

Marks, $\frac{C\ T_1}{L_4}$
Diameters: End, ".5047; middle, ".5046; end, ".5051.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000250	.000150			
3,000	15,000	.000450	.000200			
4,000	20,000	.000650	.000200	0.		
5,000	25,000	.000800	.000150			
6,000	30,000	.001000	.000200	0.		
7,000	35,000	.001150	.000150			
8,000	40,000	.001300	.000150	0.		
8,200	41,000	.001300	0.			
8,400	42,000	.001350	.000050			
8,600	43,000	.001400	.000050			
8,800	44,000	.001450	.000050			
9,000	45,000	.001500	.000050			Elastic limit.
9,200	46,000	.001500	0.			
9,400	47,000	.013750	.012250			
9,600	48,000	.014050	.000300			
10,000	50,000	.015750	.001700			
10,400	52,000	.018050	.002300			
10,800	54,000	.020250	.002200			
11,200	56,000	.022800	.002550			
11,600	58,000	.025350	.002550			
12,000	60,000	.028050	.002700			
12,400	62,000	.031550	.003500			
12,800	64,000	.035000	.003550			
13,200	66,000	.039150	.004150			
13,600	68,000	.044150	.005000			
14,000	70,000	.049250	.005100			
14,400	72,000	.057000	.007750			
14,800	74,000	.0600	.0030			
15,200	76,000	.0700	.0100			
15,600	78,000	.0850	.0150			
16,000	80,000	.1050	.0200			
16,400	82,000	.1500	.0450			
16,420	82,100					Tensile strength.
13,800						At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	82,100
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.3000
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per centum of original section		43.1
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".29", ".31"

No. 3946.

Marks, $\frac{C\ T_1}{L_4}$

Diameters: End, ".5654; middle, ".5645; end, ".5654.

Sectional area, .25 square inch.

Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000333	.000166	.....	.....	
3,750	15,000	.000533	.000200	.....	.....	
5,000	20,000	.000700	.000167	0.	.....	
6,250	25,000	.000833	.000133	.....	.....	
7,500	30,000	.001067	.000234	.....	.....	
8,750	35,000	.001267	.000200	.....	.....	
10,000	40,000	.001400	.000133	.000067	.000067	
10,250	41,000	.001433	.000033	.....	.....	
10,500	42,000	.001467	.000034	.....	.....	
10,750	43,000	.001500	.000033	.....	.....	
11,000	44,000	.001533	.000033	.....	.....	
11,250	45,000	.001567	.000034	.....	.....	
11,500	46,000	.001633	.000066	.....	.....	Elastic limit.
		.014333	.012700	.....	.....	
11,750	47,000	.014500	.000167	.....	.....	
12,000	48,000	.014600	.000100	.....	.....	
12,250	49,000	.015000	.000400	.....	.....	
12,500	50,000	.016333	.001333	.....	.....	
13,000	52,000	.018833	.002500	.....	.....	
13,500	54,000	.020833	.002000	.....	.....	
14,000	56,000	.023400	.002567	.....	.....	
14,500	58,000	.026167	.002767	.....	.....	
15,000	60,000	.029333	.003166	.....	.....	
15,500	62,000	.033000	.003667	.....	.....	
16,000	64,000	.036500	.003500	.....	.....	
16,500	66,000	.040067	.003567	.....	.....	
17,000	68,000	.046667	.006600	.....	.....	
17,500	70,000	.0533	.006633	.....	.....	
18,000	72,000	.0600	.0067	.....	.....	
18,500	74,000	.0667	.0067	.....	.....	
19,000	76,000	.0733	.0066	.....	.....	
19,500	78,000	.0933	.0200	.....	.....	
20,000	80,000	.1133	.0200	.....	.....	
20,400	81,600	.1900	.0767	.....	.....	Tensile strength.
16,700	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	81,600
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2667
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".16, ".46*, ".18

No. 3947.

Marks, $\frac{C}{L_3}\frac{T_1}{}$
Diameters: End, ".5642; middle, ".5642; end, ".5643.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
3,750	15,000	.000533	.000200	.....	.....	
5,000	20,000	.000700	.000167	.000033	.000033	
6,250	25,000	.000867	.000167	.....	.....	
7,500	30,000	.001067	.000200	.....	.....	
8,750	35,000	.001267	.000200	.....	.....	
10,000	40,000	.001467	.000200	.000033	0.	
10,250	41,000	.001500	.000033	.....	.....	
10,500	42,000	.001534	.000033	.....	.....	
10,750	43,000	.001567	.000034	.....	.....	
11,000	44,000	.001600	.000033	.....	.....	Elastic limit.
11,250	45,000	.010833	.009233	.....	.....	
11,500	46,000	.012667	.001834	.....	.....	
11,750	47,000	.013133	.000466	.....	.....	
12,000	48,000	.013967	.000834	.....	.....	
12,500	50,000	.016333	.002366	.....	.....	
13,000	52,000	.018267	.001934	.....	.....	
13,500	54,000	.020500	.002233	.....	.....	
14,000	56,000	.023267	.002767	.....	.....	
14,500	58,000	.025567	.002300	.....	.....	
15,000	60,000	.028800	.003233	.....	.....	
15,500	62,000	.031733	.002933	.....	.....	
16,000	64,000	.036233	.004500	.....	.....	
16,500	66,000	.040600	.004367	.....	.....	
17,000	68,000	.0433	.0027	.....	.....	
17,500	70,000	.0500	.0067	.....	.....	
18,000	72,000	.0567	.0067	.....	.....	
18,500	74,000	.0633	.0066	.....	.....	
19,000	76,000	.0733	.0100	.....	.....	
19,500	78,000	.0900	.0167	.....	.....	
20,000	80,000	.1067	.0167	.....	.....	
20,500	82,000	.1600	.0533	.....	.....	
20,510	82,040	.....	.....	.....	.....	Tensile strength.
17,200	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	82,040
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch...	.2767
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.174
Reduction in area after rupture, per centum of original section		52.2
Position of rupture		1".65 from neck
Character of broken surface		fine silky
Elongation of inch sections		".19, ".47", ".17

No. 3948.

Marks, $\frac{C\,T_2}{L_2}$
Diameters: End, ".5047; middle, ".5048; end, ".5051.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000650	.000200	0.	.....	
5,000	25,000	.000850	.000200	.....	.....	
6,000	30,000	.001050	.000200	.....	.....	
7,000	35,000	.001250	.000200	.....	.....	
8,000	40,000	.001400	.000150	.000050	.000050	
9,000	45,000	.001500	.000100	.....	.....	
10,000	50,000	.001650	.000150	.....	.....	
10,200	51,000	.001700	.000050	.....	.....	
10,400	52,000	.001750	.000050	.....	.....	
10,600	53,000	.001800	.000050	.....	.....	
10,800	54,000	.001800	0.	.....	.....	Elastic limit.
11,000	55,000	.007900	.006100	.....	.....	
11,200	56,000	.008750	.000850	.....	.....	
11,600	58,000	.011000	.002250	.....	.....	
12,000	60,000	.012950	.001950	.....	.....	
12,400	62,000	.015000	.002050	.....	.....	
12,800	64,000	.017500	.002500	.....	.....	
13,200	66,000	.020000	.002500	.....	.....	
13,600	68,000	.022600	.002600	.....	.....	
14,000	70,000	.025400	.002800	.....	.....	
14,400	72,000	.028650	.003250	.....	.....	
14,800	74,000	.032000	.003350	.....	.....	
15,200	76,000	.035250	.003250	.....	.....	
15,600	78,000	.040150	.004900	.....	.....	
16,000	80,000	.047900	.007750	.....	.....	
16,400	82,000	.0525	.0046	.....	.....	
16,800	84,000	.0600	.0075	.....	.....	
17,200	86,000	.0850	.0250	.....	.....	
17,830	89,150	.....	.....	.....	.....	Tensile strength.
13,500	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	89,150
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.285
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per centum of original section		59.8
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		".27*, ".30*

No. 3949.

Marks, $\frac{C\ T_2}{L_4}$

Diameters: End, ".5055; middle, ".5049; end, ".5054.

Sectional area, .20 square inch.

Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000250	.000150			
3,000	15,000	.000450	.000200			
4,000	20,000	.000600	.000150	0.		
5,000	25,000	.000800	.000200			
6,000	30,000	.000950	.000150			
7,000	35,000	.001100	.000150			
8,000	40,000	.001300	.000200	.000050	.000050	
9,000	45,000	.001450	.000150			
9,200	46,000	.001450	0.			
9,400	47,000	.001500	.000050			
9,600	48,000	.001550	.000050			
9,800	49,000	.001550	0.			
10,000	50,000	.001600	.000050	0.	— .000050	
10,200	51,000	.001650	.000050			
10,400	52,000	.001700	.000050			Elastic limit.
10,600	53,000	.004650	.002950			
10,800	54,000	.007400	.002750			
11,200	56,000	.009050	.001650			
11,600	58,000	.011500	.002450			
12,000	60,000	.013500	.002000			
12,400	62,000	.015600	.002100			
12,800	64,000	.018250	.002650			
13,200	66,000	.020700	.002450			
13,600	68,000	.023200	.002500			
14,000	70,000	.025750	.002550			
14,400	72,000	.028650	.002900			
14,800	74,000	.032800	.004150			
15,200	76,000	.036750	.003950			
15,600	78,000	.041350	.004600			
16,000	80,000	.049100	.007750			
16,400	82,000	.0550	.0059			
16,800	84,000	.0625	.0075			
17,200	86,000	.0850	.0225			
17,600	88,000	.1100	.0250			
17,720	88,600	.1650	.0550			Tensile strength.
13,700						At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	88,600
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2800
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per centum of original section		57.2
Position of rupture		1".20 from neck
Character of broken surface		fine silky
Elongation of inch sections		".35," ".21

No. 3950.

Marks, $\frac{C}{L_s}\ T_3$

Diameters: End, ".5642; middle, ".5643; end, ".5643.

Sectional area, .25 square inch.

Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	.....	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000367	.000200	.....	.....	
3,750	15,000	.000533	.000166	.....	.....	
5,000	20,000	.000733	.000200	.000033	.000033	
6,250	25,000	.000900	.000167	.....	.....	
7,500	30,000	.001067	.000167	.....	.....	
8,750	35,000	.001233	.000166	.....	.....	
10,000	40,000	.001433	.000200	.000100	.000067	
11,250	45,000	.001633	.000200	.....	.....	
11,500	46,000	.001633	0.	.....	.....	
11,750	47,000	.00 667	.000034	.....	.....	
12,000	48,000	.001700	.000033	.....	.....	
12,250	49,000	.001733	.000033	.....	.....	
12,500	50,000	.001767	.000034	.....	.....	
12,750	51,000	.001800	.000033	.....	.....	
13,000	52,000	.001867	.000067	.....	.....	Elastic limit.
13,250	53,000	.002000	.000733	.....	.....	
13,500	54,000	.006333	.003733	.....	.....	
14,000	56,000	.008500	.002167	.....	.....	
14,500	58,000	.010500	.002000	.....	.....	
15,000	60,000	.012333	.001833	.....	.....	
15,500	62,000	.014600	.002267	.....	.....	
16,000	64,000	.016933	.002333	.....	.....	
16,500	66,000	.019200	.002267	.....	.....	
17,000	68,000	.021733	.002533	.....	.....	
17,500	70,000	.024500	.002767	.....	.....	
19,000	72,000	.027100	.002600	.....	.....	
18,500	74,000	.030667	.003567	.....	.....	
19,000	76,000	.034500	.003833	.....	.....	
19,500	78,000	.038667	.004167	.....	.....	
20,000	80,000	.04167	.003003	.....	.....	
20,500	82,000	.0500	.00833	.....	.....	
21,000	84,000	.0600	.0100	.....	.....	
21,500	86,000	.0667	.0067	.....	.....	
22,000	88,000	.0867	.0200	.....	.....	
22,320	89,280	.1333	.0466	.....	.....	Tensile strength.
16,900	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	89,280
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59.3
Position of rupture		1".25 from neck
Character of broken surface		fine silky
Elongation of inch sections		".29*, ".30*, ".13

No. 3951.

Marks, $^{C}_{L_2}T_2$
Diameters: End, ".5643; middle, ".5642; end, ".5642.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
3,750	15,000	.000500	.000167	.....	.....	
5,000	20,000	.000700	.000200	.000033	.000033	
6,250	25,000	.000933	.000233	.....	.....	
7,500	30,000	.001167	.000234	.....	.....	
8,750	35,000	.001333	.000166	.....	.....	
10,000	40,000	.001500	.000167	.000100	.000067	
11,250	45,000	.001667	.000167	.....	.....	
11,500	46,000	.001700	.000033	.....	.....	
11,750	47,000	.001700	0.	.....	.....	
12,000	48,000	.001733	.000033	.....	.....	
12,250	49,000	.001767	.000034	.....	.....	
12,500	50,000	.001800	.000033	.....	.....	
12,750	51,000	.001833	.000033	.....	.....	Elastic limit.
13,000	52,000	.002000	.000167	.....	.....	
13,250	53,000	.003333	.001333	.....	.....	
13,500	54,000	.006667	.003334	.....	.....	
14,000	56,000	.009000	.002333	.....	.....	
14,500	58,000	.010567	.001567	.....	.....	
15,000	60,000	.012733	.002166	.....	.....	
15,500	62,000	.014667	.001934	.....	.....	
16,000	64,000	.016900	.002233	.....	.....	
16,500	66,000	.019167	.002267	.....	.....	
17,000	68,000	.021567	.002400	.....	.....	
17,500	70,000	.024300	.002733	.....	.....	
18,000	72,000	.027500	.003200	.....	.....	
18,500	74,000	.030733	.003233	.....	.....	
19,000	76,000	.034500	.003767	.....	.....	
19,500	78,000	.038667	.004167	.....	.....	
20,000	80,000	.0433	.004633	.....	.....	
20,500	82,000	.0500	.0067	.....	.....	
21,000	84,000	.0567	.0067	.....	.....	
21,500	86,000	.0667	.0100	.....	.....	
22,000	88,000	.0900	.0233	.....	.....	
22,220	88,880	.1283	.0383	.....	.....	Tensile strength.
17,300	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	88,880
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2467
Elongation per inch under strain at elastic limit	do....	.001833
Reduction in diameter at point of rupture	do....	.204
Reduction in area after rupture, per centum of original section		59.3
Position of rupture		1".45 from neck
Character of broken surface		fine silky
Elongation of inch sections		".13, ".42, ".19

No. 3952.

Marks, $\frac{C T_2}{L_{19}}$

Diameters: End, ".5500; middle, ".5496; .2 inch from end, ".5500.
Sectional area, .237 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
237	1,000	0.	0.	0.	0.	Initial load.
1,185	5,000	.000175	.000175	0.	.....	
2,370	10,000	.000375	.000200	.....	.....	
3,555	15,000	.000525	.000150	.....	.....	
4,740	20,000	.000675	.000150	0.	.....	
5,925	25,000	.000875	.000200	.....	.....	
7,110	30,000	.001050	.000175	.....	.....	
8,295	35,000	.001200	.000150	.....	.....	
9,480	40,000	.001350	.000150	0.	.....	
10,665	45,000	.001550	.000200	.....	.....	
10,902	46,000	.001575	.000025	.....	.....	
11,139	47,000	.001625	.000050	.....	.....	
11,376	48,000	.001650	.000025	.....	.....	
11,613	49,000	.001700	.000050	.....	.....	
11,850	50,000	.001725	.000025	.....	.....	
12,087	51,000	.001775	.000050	.....	.....	
12,324	52,000	.001825	.000050	.....	.....	Elastic limit.
12,561	53,000	.002875	.001050	.....	.....	
12,798	54,000	.007675	.004800	.....	.....	
13,272	56,000	.009500	.001825	.....	.....	
13,746	58,000	.011125	.001625	.....	.....	
14,220	60,000	.013475	.002350	.....	.....	
14,694	62,000	.015750	.002275	.....	.....	
15,168	64,000	.018125	.002375	.....	.....	
15,642	66,000	.019909	.001775	.....	.....	
16,116	68,000	.023000	.003100	.....	.....	
16,590	70,000	.023625	.000625	.....	.....	
17,064	72,000	.026375	.002750	.....	.....	
17,538	74,000	.031875	.005500	.....	.....	
18,012	76,000	.0350	.004125	.....	.....	
18,486	78,000	.0425	.0075	.....	.....	
18,960	80,000	.0500	.0075	.....	.....	
19,434	82,000	.0575	.0075	.....	.....	
19,908	84,000	.0650	.0075	.....	.....	
20,382	86,000	.0775	.0125	.....	.....	
20,856	88,000	.1050	.0275	.....	.....	
20,910	88,230	.1250	.0200	.....	.....	Tensile strength.
16,100	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	88,230
Elastic limit per square inch of original section	do ..	52,000
Elongation per inch after rupture	inch..	.2800
Elongation per inch under strain at elastic limit	do ..	.001825
Reduction in diameter at point of rupture	do...	.200
Reduction in area after rupture, per centum of original section		59.4
Position of ruptnre		2".40 from neck
Character of broken surface		fine silky
Elongation of inch sections		".13, ".37*, ".30, ".12

No. 3953.

Marks, $\frac{C\ T_3}{L_{1,2}}$

Diameters: End, ".5505; middle, ".5490; end, ".5510, tapers rapidly.
Sectional area, .237 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
237	1,000	0.	0.	0.	0.	Initial load.
1,185	5,000	.000125	.000125	0.	.....	
2,370	10,000	.000325	.000200	.....	.....	
3,555	15,000	.000500	.000175	.....	.....	
4 740	20.000	.000675	.000175	0.	.....	
5,925	25,000	.000825	.000150	.....	.....	
7,110	30.000	.001000	.000175	.....	.....	
8,295	35.000	.001175	.000175	.....	.....	
9,480	40,000	.001325	.000150	0.	.....	
10,665	45.000	.001500	.000175	.....	.....	
10,902	46,000	.001550	.000050	.....	.....	
11,139	47,000	.001575	.000025	.....	.....	
11,376	48,000	.001625	.000050	.....	.....	
11,613	49,000	.001650	.000025	.....	.....	
11,850	50,000	.001675	.000025	.....	.....	
12,087	51,000	.001725	.000050	.....	.....	
12,324	52,000	.001750	.000025	.....	.....	
12,561	53,000	.001775	.000025	.....	.....	
12,798	54,000	.001825	.000050	.....	.....	Elastic limit.
13,035	55,000	.003250	.001425	.....	.....	
13,272	56,000	.005450	.002200	.....	.....	
13,746	58,000	.008800	.003350	.....	.....	
14,220	60,000	.011250	.002450	.....	.....	
14,694	62,000	.013450	.002200	.....	.....	
15,168	64,000	.015700	.002250	.....	.....	
15,642	66,000	.017500	.001800	.....	.....	
16,116	68,000	.020175	.002675	.....	.....	
16,590	70,000	.023000	.002825	.....	.....	
17,064	72,000	.026100	.003100	.....	.....	
17,538	74,000	.028625	.002525	.....	.....	
18,012	76,000	.03125	.002625	.....	.....	
18,486	78,000	.03750	.00625	.....	.....	
18,960	80,000	.04375	.00625	.....	.....	
19,434	82,000	.0500	.00625	.....	.....	
19,908	84,000	.0550	.0050	.....	.....	
20,382	86,000	.0650	.0100	.....	.....	
20,856	88,000	.0800	.0150	.....	.....	
21,330	90,000	.1300	.0500	.....	.....	Tensile strength.
16,200	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	90,000
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2175
Elongation per inch under strain at elastic limit	do...	.001825
Reduction in diameter at point of rupture	do...	.200
Reduction in area after rupture, per centum of original section		59.4
Position of rupture		2".25 from neck
Character of broken surface		fine silky
Elongation of inch sections		".11, ".30, ".43*, ".13

No. 3954.

Marks, $\frac{C\ T_3}{L_2}$
Diameters: End, ".5056; middle, ".5046+; end, ".5048.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	.....	
2,000	10,000	.000300	.000150	.....	.....	
3,000	15,000	.000400	.000100	.....	.....	
4,000	20,000	.000550	.000150	0.	.....	
5,000	25,000	.000750	.000200	.....	.....	
6,000	30,000	.000950	.000200	.....	.....	
7,000	35,000	.001100	.000150	.....	.....	
8,000	40,000	.001300	.000200	.000050	.000050	
9,000	45,000	.001500	.000200	.....	.....	
10,000	50,000	.001650	.000150	.....	.....	
11,000	55,000	.001850	.000200	.....	.....	
12,000	60,000	.002000	.000150	.000100	.000050	
13,000	65,000	.002250	.000250	.....	.....	
14,000	70,000	.002400	.000150	.....	.....	
14,200	71,000	.002400	0.	.....	.....	
14,400	72,000	.002450	.000050	.....	.....	
14,600	73,000	.002500	.000050	.....	.....	
14,800	74,000	.002500	0.	.....	.....	
15,000	75,000	.002550	.000050	.....	.....	
15,200	76,000	.002550	0.	.....	.....	
15,400	77,000	.002600	.000050	.....	.....	Elastic limit.
15,600	78,000	.003600	.001000	.....	.....	
15,800	79,000	.008250	.004650	.....	.....	
16,000	80,000	.008750	.000500	.....	.....	
16,400	82,000	.010100	.001350	.....	.....	
16,800	84,000	.011600	.001500	.....	.....	
17,200	86,000	.013100	.001500	.....	.....	
17,600	88,000	.014700	.001600	.....	.....	
18,000	90,000	.016650	.001950	.....	.....	
18,400	92,000	.018000	.001350	.....	.....	
18,800	94,000	.019750	.001750	.....	.....	
19,200	96,000	.021300	.001550	.....	.....	
19,600	98,000	.023600	.002300	.....	.....	
20,000	100,000	.025500	.001900	.....	.....	
20,400	102,000	.027450	.001950	.....	.....	
20,800	104,000	.030850	.003400	.....	.....	
21,200	106,000	.032600	.001750	.....	.....	
21,600	108,000	.036250	.003650	.....	.....	
22,000	110,000	.040000	.003750	.....	.....	
22,800	114,000	.0500	.0100	.....	.....	
23,600	118,000	.0575	.0075	.....	.....	
24,400	122,000	.1075	.0500	.....	.....	
24,410	122,050	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	122,050
Elastic limit per square inch of original section	do...	77,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.002600
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per centum of original section		46.2
Position of rupture		1".25 from neck
Character of broken surface		fine silky, having serrations radiating from the center
Elongation of inch sections		".27", ".14

No. 3955.

Marks, $\frac{C\ T_3}{L_4}$
Diameters: End, ".5053; middle, ".5049; end, ".5053.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	.....	
2,000	10,000	.000300	.000200	.....	.....	
3,000	15,000	.000450	.000150	.....	.....	
4,000	20,000	.000600	.000150	0.	.....	
5,000	25,000	.000800	.000200	.....	.....	
6,000	30,000	.001000	.000200	.....	.....	
7,000	35,000	.001150	.000150	.....	.....	
8,000	40,000	.001350	.000200	.000050	.000050	
9,000	45,000	.001500	.000150	.....	.....	
10,000	50,000	.001650	.000150	.....	.....	
11,000	55,000	.001850	.000200	.....	.....	
12,000	60,000	.002000	.000150	.000050	0.	
13,000	65,000	.002200	.000200	.....	.....	
14,000	70,000	.002400	.000200	.....	.....	
14,200	71,000	.002450	.000050	.....	.....	Elastic limit.
14,400	72,000	.004500	.002050	.....	.....	
14,600	73,000	.006650	.002150	.....	.....	
14,800	74,000	.007000	.000350	.....	.....	
15,200	76,000	.008650	.001650	.....	.....	
15,600	78,000	.010000	.001350	.....	.....	
16,000	80,000	.011100	.001100	.....	.....	
16,400	82,000	.012700	.001600	.....	.....	
16,800	84,000	.014150	.001450	.....	.....	
17,200	86,000	.015350	.001200	.....	.....	
17,600	88,000	.017000	.001650	.....	.....	
18,000	90,000	.018650	.001650	.....	.....	
18,400	92,000	.020250	.001600	.....	.....	
18,800	94,000	.022100	.001850	.....	.....	
19,200	96,000	.023900	.001800	.....	.....	
19,600	98,000	.025700	.001800	.....	.....	
20,000	100,000	.028150	.002450	.....	.....	
20,400	102,000	.030250	.002100	.....	.....	
20,800	104,000	.032650	.002400	.....	.....	
21,200	106,000	.035550	.002900	.....	.....	
21,600	108,000	.040000	.004450	.....	.....	
22,000	110,000	.042250	.002250	.....	.....	
22,800	114,000	.0500	.007750	.....	.....	
23,600	118,000	.0700	.0200	.....	.....	
24,360	121,800	.1200	.0500	.....	.....	Tensile strength.
20,900	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	121,800
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.2850
Elongation per inch under strain at elastic limit	do...	.002450
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per centum of original section		46.3
Position of rupture		at middle of stem
Character of broken surface		fine granular, radiating from a silky spot at circumference
Elongation of inch sections		".25",".16

No. 3956.

Marks, $\frac{C\ T_3}{L_3}$
Diameters: End, ".5654; middle, ".5644; end, ".5655.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000367	.000200	.....	.....	
3,750	15,000	.000533	.000166	.....	.....	
5,000	20,000	.000733	.000200	0.	.....	
6,250	25,000	.000900	.000167	.....	.....	
7,500	30,000	.001100	.000200	.....	.....	
8,750	35,000	.001267	.000167	.....	.....	
10,000	40,000	.001433	.000166	.000033	.000033	
11,250	45,000	.001600	.000167	.....	.....	
12,500	50,000	.001767	.000167	.....	.....	
13,750	55,000	.001933	.000166	.....	.....	
15,000	60,000	.002100	.000167	.....	.....	
16,250	65,000	.002233	.000133	.....	.....	
16,500	66,000	.002267	.000034	.....	.....	
16,750	67,000	.002300	.000033	.....	.....	
17,000	68,000	.002333	.000033	.....	.....	
17,250	69,000	.002367	.000034	.....	.....	
17,500	70,000	.002400	.000033	.....	.....	
17,750	71,000	.002433	.000033	.....	.....	
18,000	72,000	.002500	.000067	.....	.....	Elastic limit.
18,250	73,000	.006300	.000038	.....	.....	
18,500	74,000	.006933	.000633	.....	.....	
19,000	76,000	.008267	.001334	.....	.....	
19,500	78,000	.009733	.001466	.....	.....	
20,000	80,000	.010667	.000934	.....	.....	
20,500	82,000	.012167	.001500	.....	.....	
21,000	84,000	.013667	.001500	.....	.....	
21,500	86,000	.014867	.001200	.....	.....	
22,000	88,000	.016433	.001566	.....	.....	
22,500	90,000	.018000	.001567	.....	.....	
23,000	92,000	.019533	.001533	.....	.....	
23,500	94,000	.021267	.001734	.....	.....	
24,000	96,000	.023100	.001833	.....	.....	
24,500	98,000	.025467	.002367	.....	.....	
25,000	100,000	.027200	.001733	.....	.....	
25,500	102,000	.029300	.002100	.....	.....	
26,000	104,000	.032167	.002867	.....	.....	
26,500	106,000	.035167	.003000	.....	.....	
27,000	108,000	.038000	.002833	.....	.....	
27,500	110,000	.042167	.004167	.....	.....	
28,500	114,000	.0567	.014533	.....	.....	
29,500	118,000	.0667	.0100	.....	.....	
30,310	121,240	.1200	.0533	.....	.....	Tensile strength.
25,900	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	121,240
Elastic limit per square inch of original section	do ..	72,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.002500
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		at middle of stem
Character of broken surface		silky, trace of granulation; serrations radiating from center of bar
Elongation of inch sections		".10, ".33*, ".09

No. 3957.

Marks, $^{C}_{L_2}{}^{T_3}$
Diameters: End, ".5642; middle, ".5642+; end, ".5642.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
3,750	15,000	.000433	.000166	.....	.....	
5,000	20,000	.000600	.000167	0.	.....	
6,250	25,000	.000800	.000200	.....	.....	
7,500	30,000	.000967	.000167	.....	.....	
8,750	35,000	.001167	.000200	.....	.....	
10,000	40,000	.001300	.000133	0.	.....	
11,250	45,000	.001500	.000200	.....	.....	
12,500	50,000	.001667	.000167	.....	.....	
13,750	55,000	.001833	.000166	.....	.....	
15,000	60,000	.002000	.000167	.....	.....	
16,250	65,000	.002200	.000200	.....	.....	
16,500	66,000	.002267	.000067	.....	.....	
16,750	67,000	.002300	.000033	.....	.....	
17,000	68,000	.002333	.000033	.....	.....	
17,250	69,000	.002367	.000034	.....	.....	
17,500	70,000	.002400	.000033	.....	.....	Elastic limit.
17,750	71,000	.006000	.003600	.....	.....	
18,000	72,000	.007233	.001233	.....	.....	
18,500	74,000	.008500	.001267	.....	.....	
19,000	76,000	.009767	.001267	.....	.....	
19,500	78,000	.011167	.001400	.....	.....	
20,000	80,000	.012833	.001666	.....	.....	
20,500	82,000	.014200	.001367	.....	.....	
21,000	84,000	.015600	.001400	.....	.....	
21,500	86,000	.017367	.001767	.....	.....	
22,000	88,000	.018633	.001266	.....	.....	
22,500	90,000	.020833	.002200	.....	.....	
23,000	92,000	.022333	.001500	.....	.....	
23,500	94,000	.024600	.002267	.....	.....	
24,000	96,000	.026267	.001667	.....	.....	
24,500	98,000	.029000	.002733	.....	.....	
25,000	100,000	.031833	.002833	.....	.....	
25,500	102,000	.034167	.002334	.....	.....	
26,000	104,000	.037500	.003333	.....	.....	
26,500	106,000	.040933	.003433	.....	.....	
27,000	108,000	.045833	.004900	.....	.....	
27,500	110,000	.051333	.005500	.....	.....	
28,500	114,000	.0667	.015367	.....	.....	
29,500	118,000	.1000	.0333	.....	.....	
29,510	118,040	.1200	.0200	.....	.....	Tensile strength.
25,300	.....	.....	.....	.....	.....	At time of fracture.

General summary.

Tensile strength per square inch of original section	pounds..	118,040
Elastic limit per square inch of original section	do...	76,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.002400
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		1".10 from neck
Character of broken surface		silky, trace of granulation, serrations radiate from center of bar
Elongation of inch sections		".27, ".17, ".10

TABULATION OF SPECIMENS TAKEN FROM BARS FURNISHED BY BETHLEHEM IRON COMPANY.

No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 2, 3, and 4 inches.		Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Inch.*	*Per ct.*	*Per ct.*		" " " "
3944	CT_1 L_2	.5046	.20	45,000	81,950	.61	30.5	49.1	Fine silky	.41*, .20
3945	CT_1 L_4	.5046	.20	46,000	82,100	.60	30.0	49.1	....do	.29*, .31*
3946	CT_1 L_6	.5645	.25	46,000	81,600	.80	26.7	54.6	....do	.16, .46*, .18
3947	CT_1 L_8	.5642	.25	44,000	82,040	.83	27.7	52.2	....do	.19, .47*, .17
3948	CT_2 L_2	.5047	.20	54,000	89,150	.57	28.5	59.8	....do	.27*, .30*
3949	CT_2 L_4	.5049	.20	52,000	88,600	.56	28.0	57.2	....do	.35*, .21
3950	CT_2 L_6	.5642	.25	52,000	89,280	.72	24.0	59.3	....do	.29*, .30*, .13
3951	CT_2 L_8	.5642	.25	51,000	88,880	.74	24.7	59.3	....do	.13, .42*, .19
3952	CT_2 L_{10}	.5490	.237	52,000	88,230	.92	23.0	59.4	....do	.15, .37*, .30, .12
3953	CT_2 L_{12}	.5496	.237	54,000	90,000	.87	21.8	59.4	....do	.11, .20, .43*, .13
3954	CT_3 L_2	.5046+	.20	77,000	122,050	.41	20.5	46.2	....do	.27*, .14
3955	CT_3 L_4	.5049	.20	71,000	121,800	.41	20.5	40.3	Fine granular, radiating from a silky spot at the circumference	.25*, .16
3956	CT_3 L_6	.5644	.25	72,000	121,240	.52	17.3	41.9	Silky, trace of granulation. Serrations radiating from center of bar.	.10, .33*, .09
3957	CT_3 L_8	.5642	.25	70,000	118,040	.54	18.0	44.6	....do	.27*, .17, .10

STEEL SPECIMENS

FROM

BETHLEHEM IRON COMPANY.

Tests made for comparison of testing machines.

H. Ex. 165——53

No. 4226.

Mark, 1.
Diameter, ".560.
Sectional area, .246 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	Initial load.
5,000	.....	.000625	.000625	0.	.....	
5,250	.....	.000650	.000025	.....	.....	
5,500	.....	.000675	.000025	.....	.....	
5,750	.....	.000700	.000025	.....	.....	
6,000	.....	.000750	.000050	.....	.....	
7,000	.....	.000900	.000050	.....	.....	
8,000	.....	.001025	.000125	.....	.....	
9,000	.....	.001175	.000150	.....	.....	
10,000	.....	.001300	.000125	.....	.....	
11,000	.....	.001425	.000125	.....	.....	
12,000	.....	.001550	.000125	.....	.....	
13,000	.....	.001675	.000125	.....	.....	
14,000	.....	.001825	.000150	.....	.....	
15,000	.....	.001950	.000125	.....	.....	
16,000	.....	.002075	.000125	.....	.....	
17,000	.....	.002250	.000175	.....	.....	
18,000	.....	.002400	.000150	.....	.....	
19,000	.....	.002525	.000125	.....	.....	
20,000	.....	.002700	.000175	0.	.....	
20,250	.....	.002725	.000025	.....	.....	
20,500	.....	.002750	.000025	.....	.....	
20,750	.....	.002775	.000025	.....	.....	
21,000	.....	.002800	.000025	.....	.....	
22,000	.....	.002950	.000150	0.	.....	
25,000	.....	.003400	.000450	.....	.....	
25,500	.....	.003450	.000050	.....	.....	
26,000	.....	.003525	.000075	.....	.....	
26,500	.....	.003575	.000050	.....	.....	
27,000	.....	.003675	.000100	.....	.....	
27,500	.....	.003750	.000075	.....	.....	
28,000	.....	.003825	.000075	.....	.....	
28,500	.....	.003925	.000100	.....	.....	
29,000	.....	.004025	.000100	.....	.....	
29,500	119,920	.004175	.000150	.....	.....	Elastic limit.
30,000	.....	.006100	.001925	.....	.....	
30,500	.....	.011625	.005525	.....	.....	
31,000	.....	.016500	.004875	.....	.....	
31,500	.....	.021750	.005250	.....	.....	
32,000	.....	.031125	.009375	.....	.....	
32,770	133,210	.....	.....	.....	.....	Tensile strength.

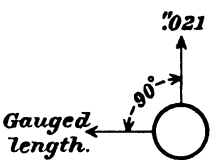
General summary.

Tensile strength per square inch of original section	pounds..	133,210
Elastic limit per square inch of original section	do...	119,920
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.004175
Reduction in diameter at point of rupture	do...	.204
Reduction in area after rupture, per centum of original section		59.3
Position of rupture		1".5 from neck
Character of broken surface		fine silky, serrated circumference; radial cracks, 12 in number, penetrate from the circumference about half way to the center of the specimen.
Elongation of inch sections		".02, ".05, ".30+, ".07

No. 4227.

Mark, 2.
Diameter, ″.5615.
Sectional area, .248 square inch.
Gauged length, 4″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	Initial load.
5,000	.....	.000650	.000650	0.	.....	
5,250	.....	.000700	.000050	.....	.....	
5,500	.....	.000725	.000025	.....	.....	
5,750	.....	.000750	.000025	.....	.....	
6,000	.....	.000775	.000025	.....	.....	
7,000	.....	.000950	.000175	.....	.....	
8,000	.....	.001075	.000125	.....	.....	
9,000	.....	.001225	.000150	.....	.....	
10,000	.....	.001350	.000125	.....	.....	
11,000	.....	.001500	.000150	.....	.....	
12,000	.....	.001625	.000125	.....	.....	
13,000	.....	.001750	.000125	.....	.....	
14,000	.....	.001925	.000175	.....	.....	
15,000	.....	.002025	.000100	.....	.....	
16,000	.....	.002200	.000175	.....	.....	
17,000	.....	.002350	.000150	.....	.....	
18,000	.....	.002500	.000150	.....	.....	
19,000	.....	.002650	.000150	.....	.....	
20,000	.....	.002775	.000125	0.	.....	
20,250	.....	.002800	.000025	.....	.....	
20,500	.....	.002825	.000025	.....	.....	
20,750	.....	.002875	.000050	.....	.....	
21,000	.....	.002900	.000025	.....	.....	
22,000	.....	.003025	.000125	0.	.....	

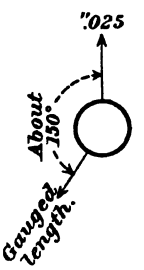


Specimen runs out ″.021 when run on centers; maximum concavity 90° from gauged length.

No. 4228.

Mark, 3.
Diameter, ".563.
Sectional area, .249 square inch.
Gauged length, 4".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0.	0.	0.	0.	0.	Initial load.
5,000	.....	.000750	.000750	0.	.....	
5,250	.....	.000890	.000050	.....	.....	
5,500	.....	.000825	.000025	.....	.....	
5,750	.....	.000875	.000050	.....	.....	
6,000	.....	.000925	.000050	.....	.....	
7,000	.....	.001075	.000150	.....	.....	
8,000	.....	.001225	.000150	.....	.....	
9,000	.....	.001350	.000125	.....	.....	
10,000	.....	.001500	.000150	.....	.....	
11,000	.....	.001650	.000150	.....	.....	
12,000	.....	.001775	.000125	.....	.....	
13,000	.....	.001925	.000150	.....	.....	
14,000	.....	.002050	.000125	.....	.....	
15,000	.....	.002200	.000150	.....	.....	
16,000	.....	.002325	.000125	.....	.....	
17,000	.....	.002500	.000175	.....	.....	
18,000	.....	.002675	.000175	.....	.....	
19,000	.....	.002800	.000125	.....	.....	
20,000	.....	.002950	.000150	.000050	.000050	
20,250	.....	.003000	.000050	.....	.....	
20,500	.....	.003025	.000025	.....	.....	
20,750	.....	.003050	.000025	.....	.....	
21,000	.....	.003100	.000050	.....	.....	
22,000	.....	.003275	.000175	0.	.....	

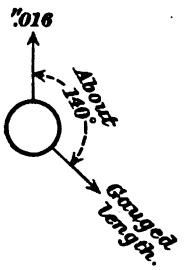


Specimen runs out ".025, about 150° from line of gauged length.

No. 4229.

Mark, 4.
Diameter, ".5615.
Sectional area, .248 square inch.
Gauged length, 4".

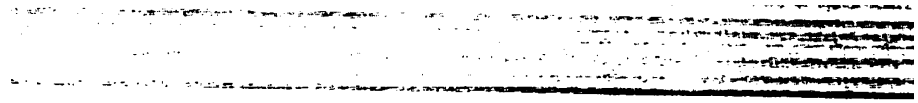
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
0	0	0.	0.	0.	0.	Initial load.
5,000	.....	.000675	.000675	0.	.....	
5,250	.....	.000700	.000025	.....	.....	
5,500	.....	.000725	.000025	.....	.....	
5,750	.....	.000750	.000025	.....	.....	
6,000	.....	.000800	.000050	.....	.....	
7,000	.....	.000950	.000150	.....	.....	
8,000	.....	.001075	.000125	.....	.....	
9,000	.....	.001200	.000125	.....	.....	
10,000	.....	.001325	.000125	.....	.....	
11,000	.....	.001475	.000150	.....	.....	
12,000	.....	.001625	.000150	.....	.....	
13,000	.....	.001775	.000150	.....	.....	
14,000	.....	.001925	.000150	.....	.....	
15,000	.....	.002050	.000125	.....	.....	
16,000	.....	.002200	.000150	.....	.....	
17,000	.....	.002375	.000175	.....	.....	
18,000	.....	.002525	.000150	.....	.....	
19,000	.....	.002650	.000125	.....	.....	
20,000	.....	.002775	.000125	0.	.....	
20,250	.....	.002800	.000025	.....	.....	
20,500	.....	.002825	.000025	.....	.....	
20,750	.....	.002875	.000050	.....	.....	
21,000	.....	.002925	.000050	.....	.....	
22,000	.....	.003050	.000125	0.	.....	



Specimen runs out ".016, about 140° from line of gauged length.

STEEL FOR FIXTURES FOR HYDROSTATIC TESTS OF SECTION OF 8-INCH TUBE.

Specimens from rings A and B, representing metal in packing glands; also from piston, for straining cylinder.



RING A.

No. 3986.

Marks, $\frac{\text{Ring A}}{T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000300	.000200	.....	.....	
5,000	20,000	.000667	.000367	.....	.....	
7,500	30,000	.001000	.000333	.....	.....	
8,750	35,000	.001167	.000167	0.	.....	
9,500	38,000	.001300	.000133	.....	.....	Elastic limit.
9,750	39,000	.003167	.001867	.....	.....	
10,000	40,000	.013500	.010333	.....	.....	
10,250	41,000	.014000	.000500	.....	.....	
10,500	42,000	.014933	.000933	.....	.....	
10,750	43,000	.015867	.000934	.....	.....	
11,000	44,000	.017167	.001300	.....	.....	
11,500	46,000	.019833	.002666	.....	.....	
12,000	48,000	.022600	.002767	.....	.....	
12,500	50,000	.025667	.003067	.....	.....	
13,000	52,000	.03167	.006003	.....	.....	
13,500	54,000	.0333	.00163	.....	.....	
14,000	56,000	.0367	.0034	.....	.....	
14,500	58,000	.0417	.0050	.....	.....	
15,000	60,000	.0500	.0083	.....	.....	
15,500	62,000	.0567	.0067	.....	.....	
16,000	64,000	.0617	.0050	.....	.....	
16,500	66,000	.0683	.0066	.....	.....	
17,000	68,000	.0833	.0150	.....	.....	
17,500	70,000	.1000	.0167	.....	.....	
18,000	72,000	.1267	.0267	.....	.....	
18,420	73,680	.2133	.0866	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,680
Elastic limit per square inch of original section	do...	38,000
Elongation per inch after rupture	inch..	.2933
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.194
Reduction in area after rupture, per centum of original section		57.0
Position of rupture		1′.30 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.41*, ″.30, ″.17

No. 3987.

Marks, $\frac{\text{Ring A}}{\text{T, M}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	.....	
2,500	10,000	.000333	.000166	.....	.....	
5,000	20,000	.000700	.000367	.....	.....	
7,500	30,000	.001033	.000333	.....	.....	
8,750	35,000	.001200	.000167	0.	.....	
9,000	36,000	.001233	.000033	.....	.....	Elastic limit.
9,250	37,000	.012667	.011434	.....	.....	
9,500	38,000	.013333	.000666	.....	.....	
9,750	39,000	.014000	.000667	.....	.....	
10,000	40,000	.015167	.001167	.....	.....	
10,500	42,000	.017333	.002166	.....	.....	
11,000	44,000	.019733	.002400	.....	.....	
11,500	46,000	.022400	.002667	.....	.....	
12,000	48,000	.025167	.002767	.....	.....	
12,500	50,000	.027833	.002666	.....	.....	
13,000	52,000	.032000	.004167	.....	.....	
13,500	54,000	.035667	.003667	.....	.....	
14,000	56,000	.039667	.004000	.....	.....	
14,500	58,000	.044667	.005000	.....	.....	
15,000	60,000	.0533	.008633	.....	.....	
15,500	62,000	.0617	.0084	.....	.....	
16,000	64,000	.0667	.0050	.....	.....	
16,500	66,000	.0733	.0066	.....	.....	
17,000	68,000	.0900	.0167	.....	.....	
17,500	70,000	.1067	.0167	.....	.....	
18,000	72,000	.1400	.0333	.....	.....	
18,370	73,480	.2233	.0833	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	73,480
Elastic limit per square inch of original section	do ..	36,000
Elongation per inch after rupture	inch..	.3600
Elongation per inch under strain at elastic limit	do....	.001233
Reduction in diameter at point of rupture	do....	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1″.60 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.24, ″.47*, ″.19

No. 4051.

Marks, $\frac{\text{Ring A}}{T_s O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	.....	.....	
5,000	20,000	.000700	.000567	.....	.....	
6,250	25,000	.000867	.000167	.....	.....	
7,500	30,000	.001033	.000166	0.	.....	
8,750	35,000	.001167	.000134	.....	.....	
10,000	40,000	.001400	.000233	0.	.....	
10,250	41,000	.001433	.000033	.....	.....	
10,500	42,000	.001467	.000034	.....	.....	
10,750	43,000	.001500	.000033	.....	.....	
11,000	44,000	.001500	0.	.....	.....	
11,250	45,000	.001567	.000067	.....	.....	
11,500	46,000	.001700	.000133	.....	.....	
11,750	47,000	.001767	.000067	.....	.....	Elastic limit.
12,000	48,000	.001900	.000133	.....	.....	
12,250	49,000	.002133	.000233	.....	.....	
12,500	50,000	.003233	.001100	.....	.....	
13,000	52,000	.006567	.003334	.....	.....	
13,500	54,000	.008567	.002000	.....	.....	
14,000	56,000	.010433	.001866	.....	.....	
14,500	58,000	.012667	.002234	.....	.....	
15,000	60,000	.014833	.002166	.....	.....	
15,500	62,000	.017067	.002234	.....	.....	
16,000	64,000	.019667	.002600	.....	.....	
16,500	66,000	.022333	.002666	.....	.....	
17,000	68,000	.025167	.002834	.....	.....	
17,500	70,000	.028333	.003166	.....	.....	
18,000	72,000	.032000	.003667	.....	.....	
18,500	74,000	.0367	.0047	.....	.....	
19,000	76,000	.0433	.0066	.....	.....	
19,500	78,000	.0467	.0034	.....	.....	
20,000	80,000	.0567	.0100	.....	.....	
20,500	82,000	.0667	.0100	.....	.....	
21,000	84,000	.0800	.0133	.....	.....	
21,500	86,000	.1333	.0533	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,000
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section	...	54.6
Position of rupture		1".50 from neck
Character of broken surface		fine silky
Elongation of inch sections		".21, ".36", ".14

No. 4052.

Mark, $\frac{\text{Ring A}}{T_4 M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	.....	
2,500	10,000	.000333	.000200	.....	.....	
5,000	20,000	.000700	.000367	.....	.....	
6,250	25,000	.000900	.000200	.....	.....	
7,500	30,000	.001100	.000200	.000033	.000033	
8,750	35,000	.001267	.000167	.....	.....	
10,000	40,000	.001433	.000166	.000067	.000034	
10,250	41,000	.001467	.000034	.....	.....	
10,500	42,000	.001533	.000066	.....	.....	
10,750	43,000	.001567	.000034	.....	.....	
11,000	44,000	.001600	.000033	.....	.....	
11,250	45,000	.001633	.000033	.....	.....	
11,500	46,000	.001700	.000067	.....	.....	Elastic limit.
11,750	47,000	.001943	.000243	.....	.....	
12,000	48,000	.002767	.000834	.....	.....	
12,250	49,000	.003267	.000500	.....	.....	
12,500	50,000	.004100	.000833	.....	.....	
13,000	52,000	.006500	.002400	.....	.....	
13,500	54,000	.008833	.002333	.....	.....	
14,000	56,000	.010667	.001834	.....	.....	
14,500	58,000	.012833	.002166	.....	.....	
15,000	60,000	.014667	.001834	.....	.....	
15,500	62,000	.016900	.002233	.....	.....	
16,000	64,000	.019167	.002267	.....	.....	
16,500	66,000	.021733	.002566	.....	.....	
17,000	68,000	.024500	.002767	.....	.....	
17,500	70,000	.027500	.003000	.....	.....	
18,000	72,000	.031000	.003500	.....	.....	
18,500	74,000	.034833	.003833	.....	.....	
19,000	76,000	.039333	.004500	.....	.....	
19,500	78,000	.0433	.003967	.....	.....	
20,000	80,000	.0533	.0100	.....	.....	
20,500	82,000	.0600	.0067	.....	.....	
21,000	84,000	.0700	.0100	.....	.....	
21,500	86,000	.0967	.0267	.....	.....	
21,780	87,120	.1433	.0466	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,120
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per centum of original section		48.7
Position of rupture		1".25 from neck
Character of broken surface		fine silky
Elongation of inch sections		".10, ".23, ".34"

RING B.

No. 4080.

Marks, $\frac{\text{Ring B}}{T_1 O}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000333	.000233	.....	.....	
5,000	20,000	.000733	.000400	.....	.....	
7,500	30,000	.001233	.000500	.....	.....	
8,750	35,000	.001400	.000167	.....	.....	
10,000	40,000	.001600	.000200	.000067	.000067	
10,500	42,000	.001633	.000033	.....	.....	
10,750	43,000	.001667	.000034	.....	.....	
11,000	44,000	.001700	.000033	.....	.....	
11,250	45,000	.001733	.000033	.....	.....	Elastic limit.
11,500	46,000	.001867	.000134	.....	.....	
11,750	47,000	.001933	.000066	.....	.....	
12,000	48,000	.002100	.000167	.....	.....	
12,250	49,000	.002433	.000333	.....	.....	
12,500	50,000	.003900	.001467	.....	.....	
12,000	52,000	.006700	.002800	.....	.....	
13,500	54,000	.008867	.002167	.....	.....	
14,000	56,000	.011000	.002133	.....	.....	
14,500	58,000	.013000	.002000	.....	.....	
15,000	60,000	.014933	.001933	.....	.....	
15,500	62,000	.017100	.002167	.....	.....	
16,000	64,000	.019333	.002233	.....	.....	
16,500	66,000	.022000	.002667	.....	.....	
17,000	68,000	.024833	.002833	.....	.....	
17,500	70,000	.027500	.002667	.....	.....	
18,000	72,000	.030833	.003333	.....	.....	
18,500	74,000	.034667	.003834	.....	.....	
19,000	76,000	.038667	.004000	.....	.....	
19,500	78,000	.043567	.004900	.....	.....	
20,000	80,000	.050000	.006433	.....	.....	
20,500	82,000	.060	.010	.....	.....	
21,000	84,000	.067	.007	.....	.....	
21,500	86,000	.090	.023	.....	.....	
21,890	87,560	.140	.050	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,560
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section		54.6
Position of rupture		1".70 from neck
Character of broken surface		fine silky
Elongation of inch sections		".15, ".42*, ".12

No. 4081.

Marks, $\frac{\text{Ring B}}{\text{T, M}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	.....	
2,500	10,000	.000267	.000200	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001100	.000167	.....	.....	
10,000	40,000	.001267	.000167	0.	.....	
10,500	42,000	.001333	.000066	.....	.....	
10,750	43,000	.001367	.000034	.....	.....	
11,000	44,000	.001433	.000066	.....	.....	Elastic limit.
11,250	45,000	.001567	.000134	.....	.....	
11,500	46,000	.001667	.000100	.....	.....	
11,750	47,000	.001933	.000266	.....	.....	
12,000	48,000	.002800	.000867	.....	.....	
12,250	49,000	.003600	.000800	.....	.....	
12,500	50,000	.004667	.001067	.....	.....	
13,000	52,000	.006667	.002000	.....	.....	
13,500	54,000	.008667	.002000	.....	.....	
14,000	56,000	.010567	.001900	.....	.....	
14,500	58,000	.012333	.001766	.....	.....	
15,000	60,000	.014500	.002167	.....	.....	
15,500	62,000	.016700	.002200	.....	.....	
16,000	64,000	.019000	.002300	.....	.....	
16,500	66,000	.021167	.002167	.....	.....	
17,000	68,000	.023667	.002500	.....	.....	
17,500	70,000	.026667	.003000	.....	.....	
18,000	72,000	.029667	.003000	.....	.....	
18,500	74,000	.032900	.003233	.....	.....	
19,000	76,000	.036667	.003767	.....	.....	
19,500	78,000	.041500	.004833	.....	.....	
20,000	80,000	.047000	.005500	.....	.....	
20,500	82,000	.055833	.008833	.....	.....	
21,000	84,000	.060633	.004800	.....	.....	
21,500	86,000	.079167	.018534	.....	.....	
22,000	88,000	.110	.030833	.....	.....	
22,050	88,200	.133	.023	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,200
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2330
Elongation per inch under strain at elastic limit	do....	.001433
Reduction in diameter at point of rupture	do...	.184
Reduction in area after rupture, per centum of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.13, ″.42, ″.15

PISTON.

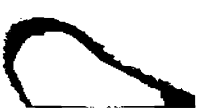
No. 4082.

Marks, $\frac{\text{Piston}}{T_1\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	.....	
2,500	10,000	.000267	.000167	.....	.....	
5,000	20,000	.000600	.000333	.....	.....	
7,500	30,000	.000933	.000333	.....	.....	
8,750	35,000	.001067	.000134	.....	.....	
10,000	40,000	.001233	.000166	0.	.....	
11,250	45,000	.001400	.000167	.....	.....	
12,500	50,000	.001600	.000200	.....	.....	
12,750	51,000	.001633	.000033	.....	.....	
13,000	52,000	.001667	.000034	.....	.....	
13,250	53,000	.001700	.000033	.....	.....	
13,500	54,000	.001733	.000033	.....	.....	
13,750	55,000	.001767	.000034	.....	.....	Elastic limit.
14,000	56,000	.001933	.000166	.....	.....	
14,250	57,000	.002267	.000334	.....	.....	
14,500	58,000	.002933	.000666	.....	.....	
15,000	60,000	.005000	.002067	.....	.....	
15,500	62,000	.007167	.002167	.....	.....	
16,000	64,000	.008833	.001666	.....	.....	
16,500	66,000	.010667	.001834	.....	.....	
17,000	68,000	.012600	.001933	.....	.....	
17,500	70,000	.014600	.002000	.....	.....	
18,000	72,000	.016500	.001900	.....	.....	
18,500	74,000	.018833	.002333	.....	.....	
19,000	76,000	.020667	.001834	.....	.....	
19,500	78,000	.023033	.002366	.....	.....	
20,000	80,000	.025600	.002567	.....	.....	
20,500	82,000	.028500	.002900	.....	.....	
21,000	84,000	.031333	.002833	.....	.....	
21,500	86,000	.034833	.003500	.....	.....	
22,000	88,000	.038667	.003834	.....	.....	
22,500	90,000	.043333	.004666	.....	.....	
23,000	92,000	.049167	.005834	.....	.....	
23,500	94,000	.055833	.006666	.....	.....	
24,000	96,000	.0700	.014167	.....	.....	
24,500	98,000	.0867	.0167	.....	.....	
25,000	100,000	.1200	.0333	.....	.....	
25,010	100,040	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100,040
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture		.134
Reduction in area after rupture, per centum of original section		41.9
Position of rupture		1" from neck
Character of broken surface		silky
Elongation of inch sections		".10, ".16, ".32*



No. 4083.

Marks, $\frac{\text{Piston}}{T_2 M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000160	.000106	0.	0.	
2,500	10,000	.000300	.000200			
5,000	20,000	.000633	.000333			
7,500	30,000	.000967	.000334			
8,750	35,000	.001133	.000166			
10,000	40,000	.001300	.000167			
11,250	45,000	.001400	.000100			
12,500	50,000	.001567	.000167			
12,750	51,000	.001600	.000033			
13,000	52,000	.001633	.000033			
13,250	53,000	.001667	.000034			
13,500	54,000	.001733	.000066			
13,750	55,000	.001800	.000067			
14,000	56,000	.001833	.000033			
14,250	57,000	.001867	.000034			
14,500	58,000	.001933	.000066			Elastic limit.
14,750	59,000	.002100	.000167			
15,000	60,000	.002433	.000333			
15,500	62,000	.003733	.001300			
16,000	64,000	.005867	.002134			
16,500	66,000	.008333	.002466			
17,000	68,000	.010400	.002067			
17,500	70,000	.012333	.001933			
18,000	72,000	.014667	.002334			
18,500	74,000	.016500	.001833			
19,000	76,000	.018667	.002167			
19,500	78,000	.021167	.002500			
20,000	80,000	.023500	.002333			
20,500	82,000	.026167	.002667			
21,000	84,000	.029000	.002833			
21,500	86,000	.032333	.003333			
22,000	88,000	.036000	.003667			
22,500	90,000	.040000	.004000			
23,000	92,000	.045333	.005333			
23,500	94,000	.050833	.005500			
24,000	96,000	.059333	.008500			
24,500	98,000	.0720	.012667			
25,000	100,000	.1000	.0280			
25,040	100,160					Tensile strength.

General summary.

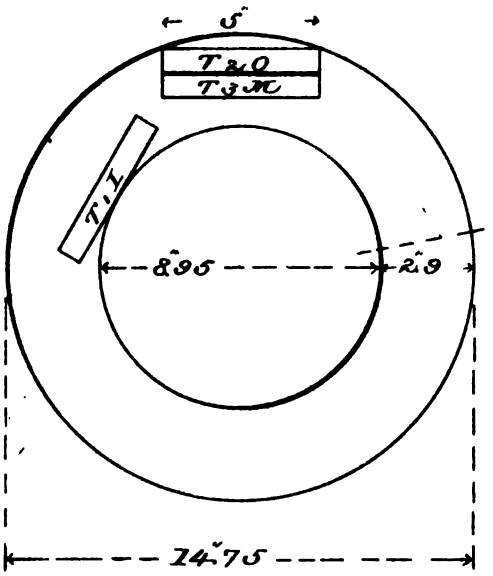
Tensile strength per square inch of original section	pounds..	100,160
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per centum of original section		44.6
Position of rupture		".85 from neck
Character of broken surface		silky
Elongation of inch sections		".08, ".12, ".33"

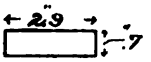
SAMPLES FROM THREE PIECES OF STEEL

FROM

LOUIS GATHMAN, CHICAGO, ILL.

A





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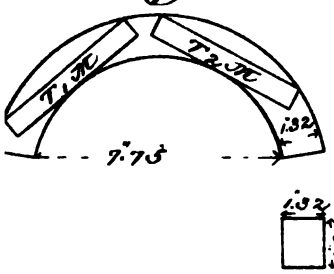

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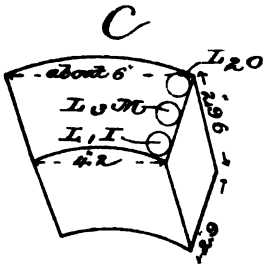

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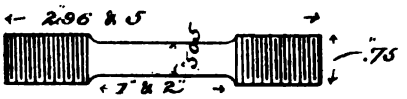


H Ex. 165 512

No. 4011.

Marks, $\frac{A}{T_1 I}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100			
2,000	10,000	.000350	.000250			
3,000	15,000	.000500	.000150			
4,000	20,000	.000700	.000200			
5,000	25,000	.000900	.000200			
6,000	30,000	.001050	.000150	.000100	.000100	
6,200	31,000	.001100	.000050			
6,400	32,000	.001150	.000050			
6,600	33,000	.001250	.000100			Elastic limit.
6,800	34,000	.001400	.000150			
7,000	35,000	.001600	.000200			
7,200	36,000	.001800	.000200			
7,400	37,000	.002000	.000200			
7,600	38,000	.002450	.000450			
7,800	39,000	.002700	.000250			
8,000	40,000	.003200	.000500	.001650	.001550	
8,400	42,000	.003700	.000500			
8,800	44,000	.003950	.000250			
9,200	46,000	.005100	.001150			
9,600	48,000	.005900	.000800			
10,000	50,000	.006900	.001000			
10,400	52,000	.007750	.000850			
10,800	54,000	.008600	.000850			
11,200	56,000	.009400	.000800			
11,600	58,000	.010350	.000950			
12,000	60,000	.011200	.000850			
12,400	62,000	.012100	.000900			
12,800	64,000	.013000	.000900			
13,200	66,000	.014000	.001000			
13,600	68,000	.015150	.001150			
14,000	70,000	.016250	.001100			
14,400	72,000	.017550	.001300			
14,800	74,000	.018800	.001250			
15,200	76,000	.020000	.001200			
15,600	78,000	.020900	.000900			
16,000	80,000	.022400	.001500			
16,400	82,000	.023700	.001300			
16,800	84,000	.025500	.001800			
17,200	86,000	.026750	.001250			
17,600	88,000	.028250	.001500			
18,000	90,000	.030350	.002100			
18,400	92,000	.032000	.001650			
18,800	94,000	.034250	.002250			
19,200	96,000	.036250	.002000			
20,000	100,000	.040	.003750			
20,800	104,000	.045	.005			
21,600	108,000	.050	.005			
22,180	110,900					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,900
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.065
Elongation per inch under strain at elastic limit	do...	.001250
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per centum of original section		5.7
Position of rupture		".95 from neck
Character of broken surface		granular
Elongation of inch sections		".09, ".04

No. 4042.

Marks, $\frac{A}{T_2O}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100			
2,000	10,000	.000350	.000250			
3,000	15,000	.000500	.000150			
4,000	20,000	.000700	.000200			
5,000	25,000	.000850	.000150			
6,000	30,000	.001050	.000200	.000050	.000050	
6,200	31,000	.001150	.000100			
6,400	32,000	.001250	.000100			
6,600	33,000	.001350	.000100			
6,800	34,000	.001450	.000100			Elastic limit.
7,000	35,000	.001700	.000250			
7,200	36,000	.002000	.000300			
7,400	37,000	.002250	.000250			
7,600	38,000	.002500	.000250			
7,800	39,000	.002900	.000400			
8,000	40,000	.003400	.000500	.001900	.001850	
8,400	42,000	.004050	.000650			
8,800	44,000	.004900	.000850			
9,200	46,000	.005500	.000600			
9,600	48,000	.006500	.001000			
10,000	50,000	.007500	.001000			
10,400	52,000	.008200	.000700			
10,800	54,000	.009100	.000900			
11,200	56,000	.010000	.000900			
11,600	58,000	.010900	.000900			
12,000	60,000	.012000	.001100			
12,400	62,000	.012900	.000900			
12,800	64,000	.014000	.001100			
13,200	66,000	.015000	.001000			
13,600	68,000	.016000	.001000			
14,000	70,000	.017000	.001000			
14,400	72,000	.018350	.001350			
14,800	74,000	.019250	.000900			
15,200	76,000	.020900	.001750			
15,600	78,000	.021750	.000850			
16,000	80,000	.023500	.001750			
16,400	82,000	.024850	.001350			
16,800	84,000	.026350	.001500			
17,200	86,000	.027850	.001500			
17,600	88,000	.029500	.001650			
18,000	90,000	.031500	.002000			
18,400	92,000	.033500	.002000			
18,800	94,000	.036000	.002500			
19,200	96,000	.038750	.002750			
19,600	98,000	.041250	.002500			
20,000	100,000	.044300	.003050			
22,040	110,200					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,200
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.070
Elongation per inch under strain at elastic limit	do...	.001450
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per centum of original section		5.7
Position of rupture		".70 from neck
Character of broken surface		granular
Elongation of inch sections		".07", ".07

No. 4043.

Marks, $T_3^A M$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100			
2,000	10,000	.000350	.000250			
3,000	15,000	.000500	.000150			
4,000	20,000	.000600	.000100			
5,000	25,000	.000800	.000200			
6,000	30,000	.001100	.000300	.000050	.000050	
6,200	31,000	.001150	.000050			
6,400	32,000	.001200	.000050			
6,600	33,000	.001350	.000150			
6,800	34,000	.001450	.000100			
7,000	35,000	.001600	.000150			Elastic limit.
7,200	36,000	.001900	.000300			
7,400	37,000	.002150	.000250			
7,600	38,000	.002450	.000300			
7,800	39,000	.002850	.000400			
8,000	40,000	.003100	.000250	.001700	.001650	
8,400	42,000	.003900	.000800			
8,800	44,000	.004750	.000850			
9,200	46,000	.005600	.000850			
9,600	48,000	.006400	.000800			
10,000	50,000	.007400	.001000			
10,400	52,000	.008350	.000950			
10,800	54,000	.009000	.000650			
11,200	56,000	.009900	.000900			
11,600	58,000	.010850	.000950			
12,000	60,000	.012000	.001150			
12,400	62,000	.012900	.000900			
12,800	64,000	.013750	.000850			
13,200	66,000	.014900	.001150			
13,600	68,000	.016000	.001100			
14,000	70,000	.017000	.001000			
14,400	72,000	.018250	.001250			
14,800	74,000	.019400	.001150			
15,200	76,000	.020600	.001200			
15,600	78,000	.022000	.001400			
16,000	80,000	.023350	.001350			
16,400	82,000	.024900	.001550			
16,800	84,000	.026400	.001500			
17,200	86,000	.028350	.001950			
17,600	88,000	.029750	.001400			
18,000	90,000	.031500	.001750			
18,400	92,000	.033900	.002400			
18,800	94,000	.036300	.002400			
19,200	96,000	.038750	.002450			
19,600	98,000	.042000	.003250			
20,000	100,000	.045500	.003500			
21,520	107,600					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	107,600
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.060
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per centum of original section		5.7
Position of rupture		″.60 from neck
Character of broken surface		granular
Elongation of inch sections		″.06, ″.06

No. 4044.

Marks, $\frac{B}{T, M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000250	.000150	.....	.....	
3,000	15,000	.000450	.000200	.....	.....	
4,000	20,000	.000600	.000150	.....	.....	
5,000	25,000	.000850	.000250	.....	.....	
6,000	30,000	.001050	.000200	0.	.....	
6,200	31,000	.001100	.000050	.....	.....	
6,400	32,000	.001150	.000050	.....	.....	
6,600	33,000	.001200	.000050	.....	.....	
6,800	34,000	.001250	.000050	.....	.....	
7,000	35,000	.001350	.000100	.....	.....	
7,200	36,000	.001400	.000050	.....	.....	
7,400	37,000	.001450	.000050	.....	.....	
7,600	38,000	.001500	.000050	.....	.....	
7,800	39,000	.001550	.000050	.....	.....	
8,000	40,000	.001600	.000050	.000100	.000100	
8,200	41,000	.002000	.000400	.....	.....	
8,400	42,000	.003250	.001250	.....	.....	
8,600	43,000	.005400	.002150	.....	.....	
8,800	44,000	.006500	.001100	.....	.....	
9,000	45,000	.007400	.000900	.....	.....	
9,200	46,000	.008350	.000950	.....	.....	
9,400	47,000	.009400	.001050	.....	.....	
9,520	47,600	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section ..... pounds.. 47,600
Elastic limit per square inch of original section ..... do... 40,000
Elongation per inch after rupture ..... inch.. .025
Elongation per inch under strain at elastic limit ..... do... .001600
Reduction in diameter at point of rupture ..... inappreciable
Position of rupture ..... ″.45 from neck
Character of broken surface.....40 per cent. granular, 60 per cent. spongy. The spongy metal varied in color from light blue to dull leaden color.

No. 4045.

Marks, $\frac{B}{T, M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	.....	.....	
2,000	10,000	.000350	.000250	.....	.....	
3,000	15,000	.000500	.000150	.....	.....	
4,000	20,000	.000700	.000200	.....	.....	
5,000	25,000	.000850	.000150	.....	.....	
6,000	30,000	.001050	.000200	0.	.....	
6,200	31,000	001050	0.	.....	.....	
6,400	32,000	.001100	.000050	.....	.....	
6,600	33,000	.001100	0.	.....	.....	
6,800	34,000	.001150	.000050	.....	.....	
7,000	35,000	.001200	.000050	.....	.....	
7,200	36,000	.001300	.000100	.....	.....	
7,400	37,000	.001350	.000050	.....	.....	
7,600	38,000	.001400	.000050	.....	.....	
7,800	39,000	.001550	.000150	.....	.....	
7,980	39,900	.....	.....	.....	.....	Tensile strength.

General summary.

Tensile strength per square inch of original section ..... pounds.. 39,900
Elongation per inch after rupture ..... inappreciable
Reduction in diameter at point of rupture ..... inappreciable
Position of rupture ..... at neck
Character of broken surface ..... granular, 30 per cent.; flaky and spongy, 70 per cent

Marks, $L_1^C I$
Diameter, ".505.
Sectional area, .20 square inch.
Length of stem, 1".
Tensile strength, 6,640 pounds = 33.200 pounds per square inch.
Fractured ".35 from neck. Appearance of fracture, granular; 30 per cent. of surface dull spongy.
Cylindrical surface of specimen showed spongy metal.

Marks, $L_2^C O$
Diameter, ".505.
Sectional area, .20 square inch.
Length of stem, 1".
Tensile strength, 5,160 pounds=25.800 pounds per square inch.
Fractured ".2 from neck. Appearance, granular, 30 per cent.; balance of fracture oblique across stem and had a dark-colored, spongy appearance.
Cylindrical surface of specimen showed spongy metal.

No. 4046.

Marks, $L_2^C M$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 1".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.0001	.0001	.....	.....	
2,000	10,000	.0002	.0001	.....	.....	
3,000	15,000	.0002	0.	.....	.....	
4,000	20,000	.0004	.0002	.....	.....	
5,000	25,000	.0012	.0008	.....	.....	
6,000	30,000	.0021	.0009	.0005	.0005	Elastic limit, approximate.
6,200	31,000	.0023	.0002	.....	.....	
6,400	32,000	.0026	.0003	.....	.....	
6,600	33,000	.0033	.0007	.....	.....	Tensile strength.

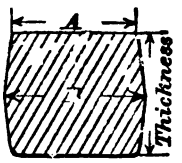
Fractured ".2 from neck. Appearance, dull granular, 40 per cent.; spongy, 60 per cent.

STEEL FROM NATIONAL ARMORY.

No. of test.	Mark on specimen.	Dimensions.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 7 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of 1-inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.						
		Inches.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	" " *Sq. in.*	*Per ct.*		" " " " " " "
3791	IR	1.503	.210	.316	24,670	78,070	28,430	89,970	1.23	17.6	1.25 × .16=.200	36.7	Fine silky trace of lamination at middle of thickness.	.12, .11, .17, .41*, .17, .13, .12
3792	IR	1.501	.212	.318	24,020	75,530	27,980	87,990	1.29	18.4	1.26 × .16=.202	36.5	....do	.12, .28, .32, .15, .15, .15, .12
3793	IW	1.502	.217	.326	25,610	78,560	30,140	92,450	1.19	17.0	1.26 × .14=.176	46.0	.. do	.15, .42*, .18, .14, .11, .10, .09
3794	IW	1.502	.218	.327	26,240	80,240	30,590	93,550	1.29	18.4	1.26 × .13=.164	49.8	....do	.12, .40*, .22, .17, .13, .14, .11
									Elongation in 3 inches.					
3392	IR	.564	Diam ...	.25	14,510	58,040	22,420	89,680	.77	25.7	.40 diam.=.126	49.6	Fine silky.....	.15, .36*, .26
3393	IR	.564	...do	.25	14,970	59,880	22,360	89,440	.69	23.0	.40 diam.=.126	49.6	....do	.13, .37*, .19
3394	IW	.564	...do	.25	11,960	47,840	17,160	68,640	.87	29.0	.37 diam.=.108	56.8	....do	.17, .48*, .22
3395	IW	.564	...do	.25	12,070	49,070	16,930	68,820	.88	29.3	.37 diam.=.108	56.1	....do	.20, .49*, .19
									Elongation in 2 inches.					
3857	IW	.564	...do	.25	12,210	48,840	18,470	73,880	.57	28.5	.42 diam.=.139	44.6	Fine silky.....	.29, .28

STRAINING OF COLD-ROLLED STAVES FOR WOODBRIDGE 10-INCH W. W. RIFLE.

Total length, 15 feet 6½ inches.

Cross 

section.

No. 3141.

Dimensions, { Thickness .... 3″.150
A ..... 3″.512
B ..... 3.″578

Sectional area, ″11.15 square inches.
Gauged length, 150″.

Applied loads.		In gauged length.		Lateral contraction in 3″.30.	Remarks.
Total.	Per square inch.	Elongation.	Set.		
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	
10, 560	947	0.	0.	.....	Initial load.
105, 600	9, 470	.0160	0.	.....	
211, 200	18, 940	.0947	.0001	.....	
316, 800	28, 410	.1444	.0007	.....	
422, 400	37, 880	.1958	.0021	.....	
528, 000	47, 350	.2502	.0035	.....	
10, 560	947	.....	.....	0.	
105, 600	9, 470	.....	.....	.0003	
211, 200	18, 940	.....	.....	.0007	
316, 800	28, 410	.....	.....	.0010	
422, 400	37, 880	.....	.....	.0013	
528, 000	47, 350	.....	.....	.0016	
422, 400	37, 880	.....	.....	.0013	
316, 800	28, 410	.....	.....	.0010	
211, 200	18, 940	.....	.....	.0006	
105, 600	9, 470	.....	.....	.0002	
10, 560	947	.....	.....	.0000	
641, 390	57, 520	.....	.....	.....	Load released and bar rotated one half turn.
679, 119	60, 910	.....	.....	.....	Maximum stress applied.
0	0	.....	.035	.....	

NOTE.—The lateral contraction under tensile stress was measured by means of a micrometer mounted transversely or at right angles to the axis of the bar.

No. 3142.

Dimensions, { Thickness....3″.164 / A .....3″.40 / B .....3″.49

Sectional area, 10.89 square inches.

Gauged length, 150″.

Applied loads.		In gauged length.		Lateral contraction in 3″.20.	Remarks.
Total.	Per square inch.	Elongation.	Set.		
Pounds.	*Pounds.*	*Inch.*	*Inch.*		
10,900	1,001	0.	0.	.....	Initial load.
109,000	10,010	.0475	.0010	.....	
218,000	20,020	.0949	.0013	.....	
327,000	30,030	.1516	.0018	.....	
436,000	40,040	.2056	.0026	.....	
545,000	50,050	.2626	.....	.....	
436,000	40,040	.2116	.....	.....	
327,000	30,030	.1591	.....	.....	
218,000	20,020	.1067	.....	.....	
109,000	10,010	.0540	.0060	.....	
109,000	10,010	.0525	.....	.....	
218,000	20,020	.1045	.....	.....	
327,000	30,030	.1570	.....	.....	
436,000	40,040	.2107	.....	.....	
545,000	50,050	.2655	.....	.....	
436,000	40,040	.2132	.....	.....	
327,000	30,030	.1607	.....	.....	
436,000	40,040	.2127	.....	.....	
545,000	50,050	.2660	.....	.....	
523,200	48,040	.2557	.....	.....	
545,000	50,050	.2667	.....	.....	
523,200	48,040	.2566	.....	.....	
436,000	40,040	.2146	.....	.....	
327,000	30,030	.1622	.....	.....	
350,000	.....	.....	.....	.....	Set micrometer with this load, which was an advancing one, then backed off micrometer ″.002, and then backed off load 400 pounds, when there was contact of micrometer, showing the above clearance (″.002) had been taken up.
218,000	20,020	.1094	.....	.....	
109,000	10,010	.0565	.0081	.....	
109,000	10,010	.0549	.....	.....	
218,000	20,020	.1070	.....	.....	
327,000	30,030	.1599	.....	.....	
218,000	20,020	.1080	.....	.....	
109,000	10,010	.0560	.0081	.....	
10,900	1,001	.....	.....	0.	
109,000	10,010	.....	.....	.0003	
218,000	20,020	.....	.....	.0006	
327,000	30,030	.....	.....	.0009	
436,000	40,040	.....	.....	.0012	
545,000	50,050	.....	.....	.0015	
436,000	40,040	.....	.....	.0012	
327,000	30,030	.....	.....	.0009	
218,000	20,020	.....	.....	.0006	
109,000	10,010	.....	.....	.0002	
10,900	1,001	.....	.....	0	
679,119	62,360	.....	.....	.....	Maximum stress applied.
0	0	.....	.03	.....	

Total load of 679,119 pounds applied to each stave.
Deflections measured in length of 136″.

No. of test.	Marks.	Dimensions.			Sectional area.	Loads applied, pounds.	Permanent set in 50″.	Total deflection after straining.
		Width.		Thickness.				
		A.	B.					
		Inch.	*Inch.*	*Inch.*	*Sq. inches.*	*Sq. inches.*	*Inch.*	*Inch.*
3157	3	3.46	3.61	3.15	11.12	61,070	.01	.....
3158	4	3.48	3.63	3.16	11.22	60,530	.00	.....
3159	5	3.40	3.54	3.15	10.92	62,190	.01	.....
3160	6	3.42	3.53	3.16	10.97	61,910	.01	.....
3161	7	3.43	3.63	3.15	11.11	61,130	.01	.....
3162	8	3.45	3.63	3.15	11.14	60,960	.01	.....
3163	9	3.45	3.61	3.13	11.04	61,510	.00	.....
3164	10	3.46	3.62	3.15	11.14	60,960	.01½	.....
3165	11	3.50	3.62	3.13	11.13	61,020	.01½	.15
3166	12	3.46	3.60	3.15	11.11	61,130	.01	.....
3167	13	3.42	3.54	3.16	10.98	61,850	.01	.10
3168	14	3.45	3.61	3.14	11.07	61,350	.01	.....
3169	15	3.50	3.53	3.16	11.09	61,240	.00	.08
3170	16	3.54	3.61	3.15	11.25	60,370	.00	.07
3171	17	3.45	3.57	3.14	11.01	61,680	.01	....
3172	18	3.54	3.59	3.14	11.18	60,740	.01	.07
3173	19	3.50	3.59	3.14	11.12	61,070	.01	.10
3174	20	3.51	3.61	3.13	11.13	61,020	.01	.....
3175	21	3.54	3.61	3.14	11.21	60,580	.00	.08
3176	22	3.46	3.53	3.15	11.00	61,740	.01	.05
3177	23	3.45	3.61	3.15	11.11	61,130	.....	.05
3178	24	3.50	3.61	3.14	11.15	60,910	.00	.08
3179	25	3.53	3.62	3.15	11.25	60,370	.00	.06

The following staves were straightened in a screw press, and strained a second time with 679,119 pounds tension: Nos. 9, 11, 13, 15, 16, 18, 19, 21, and 24. This straining appeared to increase the permanent set of the following staves ″.01 each in a gauged length of 50″: Nos. 9, 11, 13, 15, 18, and 24. The other restrained staves showed no additional sets.

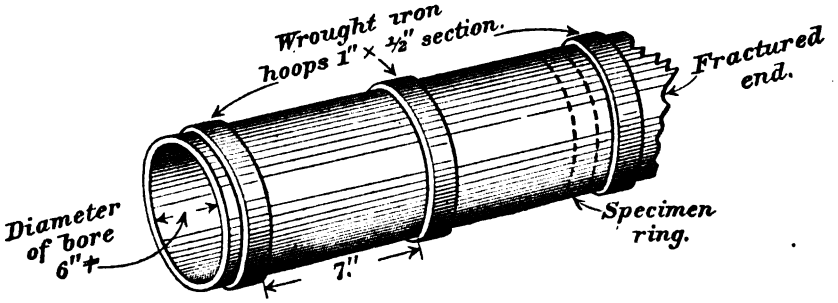
Stave No. 11 has deflection of ″.10 after straightening and second application of stress of 679,119 pounds. It was restraightened in the screw press and afterward strained with 679,119 pounds tension. No further set appeared.

PYROTECHNIC MORTAR BODY.

Tensile test of two samples cut from a fractured wrought-iron pyrotechnic mortar body which exploded July 4, 1889, at Salem, Mass.

The mortar body was made of a piece of gas pipe reinforced with hoops.

A ring 1½″ long was cut from the body near the fractured end, this ring was cut into two specimens, the specimens straightened hot and afterward tested by tension.



No. of test.	Dimensions.		Sectional area.	Tensile strength.		Fracture.
	Width.	Thickness.		Total.	Per square inch.	
	Inches.	*Inch.*	*Sq. inch.*	*Pounds.*	*Pounds.*	
4273	1.558	.278	.433	18,820	43,460	Fibrous, lamellar.
4274	1.555	.255	.396	16,940	42,780	Fibrous, lamellar, 55 per cent. Oblique following scarf of lap weld in pipe, 45 per cent.

TENSILE TESTS OF CHAIN CABLE FOR INSPECTOR THIRD U. S. LIGHT-HOUSE DISTRICT.

Samples consist of three studded links of chain with end links not studded.

No. 3875.

Studs branded "W. N. Y."
Diameter of end links, 2″.12.
Diameter of studded links, 2″.
Sectional area of studded chain, 6.28 square inches.
Tensile strength, 183,200 pounds=29.170 pounds per square inch.
Fractured end link at weld. Followed the scarf in part; balance of fracture fibrous with granular metal at one side of fractured surface.
A second fracture occurred inside of link, which was granular throughout.

No. 3875*a*.

A new end link provided and chain retested.
Tensile strength, 194,600 pounds=30.920 pounds per square inch.
Fractured outside studded link in the quarter and in the side. Both fractures were granular.

No. 3876.

Diameter of end links { 2″.14 / 1″.98
Diameter of studded links, 1″.82
Sectional area of studded chain, 5.20 square inches.
Tensile strength, 218,550 pounds=42.030 pounds per square inch.
Fractured first link of chain at weld; followed scarf in part, showing an unwelded dark-colored spot 1″ × 1⅝″; balance of fracture fibrous.

ENDURANCE OF ROTATING SHAFTS

OF

O. H. STEEL, WROUGHT-IRON, AND CAST-IRON.

863

ENDURANCE TESTS OF ROTATING SHAFTS.—TESTS CONTINUED FROM REPORT OF 1889.

The experiments herewith reported were made chiefly with two kinds of metal: a mild grade of open-hearth steel, and a soft but tough wrought iron.

The specimens were turned down from hot-rolled rods 1¼″ diameter, each of which was about 15 feet long.

The rods were marked numerically and specimens taken from them bear their distinguishing numbers.

The tests comprise bars ruptured under fiber stresses which were increased at intervals, beginning with loads below the elastic limit, rupture occurring after stresses had been reached which caused greater or less permanent sets.

The larger number of specimens, however, were subjected to special treatment, and observations on their behavior made at frequent intervals, carrying out the idea embodied in the tests of previous years, that is, giving prominence to the investigation and determination of observable changes in properties preceding ultimate rupture, as well as the effects of different treatment upon the ultimate endurance of the shafts under repeated alternate stresses.

It will be seen from the details of the tests that certain specimens were ruptured under a constant fiber stress, and others were annealed at different temperatures, and after different intervals of rotations; also that the test of certain bars which began at atmospheric temperature were allowed to acquire a higher temperature due the rapid alternation of stresses when exceeding the elastic limit, and some were maintained at a uniform low temperature by means of a stream of cold water flowing upon the experimental shaft at the middle bearing, and some bars were run at higher temperatures, either which they were allowed to acquire by the natural tendency to heat as above referred to, or were initially heated at the commencement and during the continuance of the test by means of gas-burners.

The speed of rotation was for most of the shafts kept at 400 turns per minute. A higher speed was employed, however, for a number of shafts than has heretofore been used in these investigations, namely, 2,200 rotations per minute.

It was, of course, at this higher speed that the greatest natural heating of the shafts occurred.

The opportunity afforded by this high rate of speed was utilized to extend the observations of the previous year on the relative deflection of the shaft under extremes of speed.

TEST NO. 31.

O. H. Steel from Rod No. 1.

The test of the shaft began under the maximum fiber stress of 20,000 pounds per square inch, which was continued by increments of 1,000 pounds per square inch after successive runs of 10,000 turns.

Slight permanent sets appeared under the earliest loads, but did not increase in amount until 40,000 pounds per square inch fiber stress was reached.

Under succeeding loads the sets increased, and with the increase of sets the shaft gradually acquired a higher temperature, which became painful to the touch just prior to rupture.

At the time of rupture the shaft was running under a load of 53,000 pounds per square inch, maximum fiber stress, and had made 330,410 rotations.

The tensile test of the specimen taken from the outer end of this shaft showed an apparent elastic limit of 58,000 pounds per square inch.

The rotating test was discontinued before the rupture of the shaft was completed. The fracture at the time had extended over 180 degrees of arc on the surface of the shaft, and had separated 45 per cent. of its sectional area. This section of rupture had a dull leaden hue, with a fairly smooth surface.

The balance of the fracture, after the shaft was broken transversely over the anvil, showed a fine granular appearance, but with several fine cracks extending below the cylindrical surface from ".03 to ".10, the sides of which were comparatively smooth, and were developed doubtless during the time the shaft was rotated under load.

No. 31.—*O. H. Steel Bar. Mark* 1.

Diameter 1″. Speed of rotation 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
20,000	0	0	*a*	.1993	.1846	.1992	.0146	.0001	
			b	.1990	.1817	.1992	.0145	−.0002	
			c	.1992	.1846	.1992	.0146	0.	
	10,000	10,000	*a*	.1994	.1846	.1992	.0146	.0002	
			b	.1993	.1846	.1992	.0146	.0001	
			c	.1993	.1846	.1993	.0147	0.	
21,000	0	10,000	*a*	.1993	.1838	.1992	.0154	.0001	
			b	.1993	.1838	.1992	.0154	.0001	
			c	.1993	.1838	.1992	.0154	.0001	
	10,000	20,000	*a*	.1994	.1839	.1992	.0153	.0002	
			b	.1993	.1838	.1992	.0154	.0001	
			c	.1993	.1838	.1992	.0154	.0001	
22,000	0	20,000	*a*	.1994	.1832	.1993	.0161	.0001	
			b	.1994	.1833	.1993	.0160	.0001	
			c	.1993	.1832	.1993	.0161	0.	
	10,000	30,000	*a*	.1993	.1832	.1993	.0161	0.	
			b	.1994	.1832	.1993	.0161	.0001	
			c	.1994	.1831	.1993	.0162	.0001	
23,000	0	30,000	*a*	.1994	.1824	.1993	.0169	.0001	
			b	.1994	.1824	.1993	.0169	.0001	
			c	.1994	.1824	.1993	.0169	.0001	
	10,000	40,000	*a*	.1994	.1824	.1993	.0169	.0001	
			b	.1991	.1824	.1993	.0169	.0001	
			c	.1994	.1824	.1993	.0169	.0001	
24,000	0	40,000	*a*	.1994	.1817	.1993	.0176	.0001	
			b	.1994	.1816	.1993	.0177	.0001	
			c	.1994	.1816	.1993	.0177	.0001	

No. 31.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	10,000	50,000	*a*	.1992	.1816	.1992	.0176	0.	
			b	.1994	.1816	.1992	.0176	.0002	
			c	.1994	.1815	.1992	.0177	.0002	
25,000	0	50,000	*a*	.1994	.1808	.1992	.0184	.0002	
			b	.1994	.1808	.1992	.0184	.0002	
			c	.1994	.1808	.1992	.0184	.0002	
	10,000	60,000	*a*	.1993	.1808	.1992	.0184	.0001	
			b	.1994	.1808	.1992	.0184	.0002	
			c	.1994	.1808	.1992	.0184	.0002	
26,000	0	60,000	*a*	.1994	.1802	.1992	.0190	.0002	
			b	.1994	.1802	.1993	.0191	.0001	
			c	.1994	.1802	.1993	.0191	.0001	
	10,000	70,000	*a*	.1993	.1803	.1993	.0190	0.	
			b	.1994	.1803	.1993	.0190	.0001	
			c	.1994	.1802	.1993	.0191	.0001	
27,000	0	70,000	*a*	.1993	.1794	.1993	.0199	0.	
			b	.1994	.1793	.1993	.0200	.0001	
			c	.1994	.1793	.1993	.0200	.0001	
	10,000	80,000	*a*	.1994	.1793	.1993	.0200	.0001	
			b	.1994	.1793	.1993	.0200	.0001	
			c	.1994	.1794	.1993	.0199	.0001	
28,000	0	80,000	*a*	.1993	.1792	.1993	.0201	0.	
			b	.1994	.1790	.1993	.0203	.0001	
			c	.1994	.1789	.1993	.0204	.0001	
	10,000	90,000	*a*	.1993	.1792	.1993	.0201	0.	
			b	.1994	.1791	.1993	.0202	.0001	
			c	.1994	.1789	.1993	.0204	.0001	
29,000	0	90,000	*a*	.1994	.1784	.1993	.0209	.0001	
			b	.1994	.1786	.1993	.0207	.0001	
			c	.1994	.1784	.1992	.0208	.0002	

10,000	100,000	a	1994	1783	1993	.0210	.0001		
		b	1994	1784	1993	.0209	.0001		
		c	1994	1785	1993	.0208	.0001		
30,000	100,000	a	1994	1778	1994	.0218	0.		
0		b	1994	1774	1991	.0220	0.		
		c	1994	1778	1993	.0215	.0001		
10,000	110,000	a	1994	1778	1994	.0216	0.		
		b	1995	1778	1993	.0215	.0002		
		c	1991	1776	1993	.0217	.0001		
31,000	110,000	a	1994	1770	1994	.0224	0.		
0		b	1995	1769	1993	.0224	.0002		
		c	1994	1769	1993	.0224	.0001		
10,000	120,000	a	1994	1770	1993	.0223	.0001		
		b	1994	1760	1993	.0224	.0001		
		c	1994	1768	1993	.0225	.0001		
32,000	120,000	a	1995	1764	1994	.0230	.0001		
0		b	1994	1762	1993	.0231	.0001		
		c	1994	1760	1993	.0233	.0001		
10,000	130,000	a	1994	1764	1993	.0229	.0001		
		b	1994	1764	1993	.0229	.0001		
		c	1994	1763	1992	.0229	.0002		
33,000	130,000	a	1994	1758	1993	.0235	.0001		
0		b	1994	1758	1993	.0235	.0001		
		c	1994	1754	1993	.0239	.0001		
10,000	140,000	a	1994	1755	1993	.0233	.0001		
		b	1994	1756	1993	.0237	.0001		
		c	1994	1756	1992	.0236	.0002		
34,000	140,000	a	1994	1746	1992	.0248	.0003		
0		b	1995	1745	1994	.0249	.0001		
		c	1994	1743	1993	.0250	.0001		
10,000	150,000	a	1994	1747	1994	.0247	0.		
		b	1994	1748	1993	.0245	.0001		
		c	1994	1746	1993	.0247	.0001		
35,000	150,000	a	1994	1743	1993	.0250	.0001		
0		b	1994	1743	1993	.0250	.0001		
		c	1994	1739	1993	.0254	.0001		
10,000	160,000	a	1993	1740	1993	.0253	0.		
		b	1994	1743	1993	.0250	.0001		
		c	1994	1739	1993	.0254	.0001		

No. 31.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
36,000	0	160,000	*a*	.1994	.1732	.1993	.0261	.0001	
			b	.1994	.1731	.1992	.0261	.0002	
			c	.1994	.1730	.1993	.0263	.0001	
	10,000	170,000	*a*	.1994	.1733	.1993	.0260	.0001	
			b	.1994	.1732	.1993	.0261	.0001	
			c	.1994	.1732	.1993	.0261	.0001	
37,000	0	170,000	*a*	.1994	.1726	.1993	.0267	.0001	
			b	.1994	.1724	.1993	.0269	.0001	
			c	.1994	.1724	.1993	.0269	.0001	
	10,000	180,000	*a*	.1996	.1723	.1994	.0271	.0002	
			b	.1995	.1724	.1994	.0270	.0001	
			c	.1994	.1725	.1993	.0268	.0001	
38,000	0	180,000	*a*	.1994	.1717	.1993	.0276	.0001	
			b	.1994	.1718	.1992	.0274	.0002	
			c	.1994	.1713	.1993	.0280	.0001	
	10,000	190,000	*a*	.1995	.1715	.1994	.0279	.0001	
			b	.1995	.1718	.1994	.0277	.0001	
			c	.1994	.1711	.1993	.0282	.0001	
39,000	0	190,000	*a*	.1994	.1706	.1993	.0287	.0001	
			b	.1995	.1704	.1993	.0289	.0002	
			c	.1994	.1704	.1993	.0289	.0001	
	10,000	200,000	*a*	.1994	.1711	.1994	.0283	0.	
			b	.1995	.1708	.1993	.0285	.0002	
			c	.1995	.1708	.1993	.0285	.0002	
40,000	0	200,000	*a*	.1995	.1699	.1993	.0294	.0002	
			b	.1994	.1704	.1993	.0289	.0001	
			c	.1995	.1701	.1993	.0292	.0002	
	10,000	210,000	*a*	.1994	.1701	.1993	.0292	.0001	
			b	.1996	.1702	.1993	.0291	.0003	
			c	.1996	.1702	.1993	.0291	.0003	

41,000	0	210,000	a	.1996	.1694	.1993	.0299	.0003
			b	.1995	.1696	.1993	.0297	.0002
			c	.1995	.1694	.1992	.0298	.0003
	10,000	220,000	a	.1995	.1695	.1993	.0298	.0002
			b	.1995	.1695	.1992	.0297	.0003
			c	.1995	.1693	.1988	.0300	.0002
42,000	0	220,000	a	.1996	.1685	.1993	.0308	.0003
			b	.1995	.1688	.1993	.0305	.0002
			c	.1995	.1687	.1993	.0306	.0002
	10,000	230,000	a	.1996	.1688	.1993	.0305	.0003
			b	.1997	.1688	.1953	.0305	.0004
			c	.1996	.1688	.1993	.0305	.0003
43,000	0	230,000	a	.1996	.1683	.1993	.0310	.0003
			b	.1997	.1683	.1993	.0310	.0004
			c	.1996	.1680	.1993	.0313	.0003
	10,000	240,000	a	.1998	.1682	.1992	.0310	.0006
			b	.1997	.1678	.1992	.0314	.0005
			c	.1997	.1680	.1992	.0312	.0005
44,000	0	240,000	a	.1998	.1674	.1992	.0318	.0006
			b	.1997	.1675	.1992	.0317	.0005
			c	.1997	.1674	.1992	.0318	.0005
	10,000	250,000	a	.2001	.1672	.1991	.0319	.0010
			b	.1996	.1668	.1990	.0322	.0006
			c	.1998	.1668	.1990	.0322	.0008
45,000	0	250,000	a	.1999	.1666	.1990	.0324	.0009
			b	.1998	.1664	.1989	.0325	.0009
			c	.1998	.1662	.1990	.0328	.0008
	10,000	260,000	a	.1999	.1659	.1988	.0329	.0011
			b	.1994	.1656	.1985	.0329	.0009
			c	.2002	.1655	.1987	.0332	.0015
46,000	0	260,000	a	.2000	.1650	.1987	.0337	.0013
			b	.2000	.1651	.1986	.0335	.0014
			c	.2000	.1648	.1987	.0339	.0013
	10,000	270,000	a	.2005	.1647	.1983	.0336	.0017
			b	.2008	.1647	.1983	.0336	.0025
			c	.2002	.1644	.1983	.0339	.0019
47,000	0	270,000	a	.2004	.1632	.1983	.0351	.0021
			b	.2003	.1631	.1981	.0350	.0022
			c	.2005	.1633	.1982	.0349	.0023

No. 31.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	10,000	280,000	*a*	.1987	.1618	.1964	.0346	.0023	
			b	.1992	.1625	.1971	.0346	.0021	
			c	.2020	.1631	.1978	.0347	.0042	
48,000	0	280,000	*a*	.2010	.1619	.1977	.0358	.0033	
			b	.2007	.1620	.1977	.0357	.0030	
			c	.2010	.1615	.1976	.0361	.0034	
	10,000	290,000	*a*	.2008	.1600	.1962	.0362	.0046	
			b	.2030	.1609	.1969	.0360	.0061	
			c	.2016	.1610	.1968	.0358	.0048	
49,000	0	290,000	*a*	.2010	.1609	.1970	.0361	.0046	
			b	.2015	.1610	.1970	.0360	.0045	
			c	.2016	.1606	.1968	.0362	.0048	
	10,000	300,000	*a*	.1935	.1565	.1934	.0369	.0001	
			b	.1999	.1578	.1946	.0368	.0053	
			c	.2055	.1589	.1959	.0370	.0096	
50,000	0	300,000	*a*	.2020	.1572	.1956	.0384	.0064	
			b	.2024	.1589	.1960	.0371	.0064	
			c	.2032	.1590	.1961	.0371	.0071	
	10,000	310,000	*a*	.2003	.1555	.1933	.0378	.0070	
			b	.2074	.1574	.1952	.0378	.0122	
			c	.2026	.1562	.1939	.0377	.0087	
51,000	0	310,000	*a*	.2036	.1563	.1947	.0384	.0089	
			b	.2043	.1567	.1950	.0383	.0093	
			c	.2032	.1556	.1940	.0384	.0092	
	10,000	320,000	*a*	.1859	.1566	.1853	.0387	.0006	
			b	.2095	.1536	.1918	.0382	.0177	
			c	.2096	.1604	.1945	.0381	.0151	
52,000	0	320,000	*a*	.2026	.1518	.1914	.0396	.0112	
			b	.2060	.1541	.1933	.0392	.0127	
			c	.2063	.1552	.1940	.0388	.0123	

	10,000	330,000	.....	.....	.....	.....	.....	.....	Bar very hot to the touch.
53,000	0	330,000	a	.1845	.1388	.1794	.0406	.0051	
			b	.2022	.1568	.1972	.0404	.0050	
			c	.2191	.1715	.2125	.0410	.0066	
	410	330,410	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST No. 32.—*O. H. Steel from Rod No.* 1.

A constant load was employed throughout the test, giving the maximum fiber stress 53,000 pounds per square inch. The shaft acquired a higher temperature while running, and was cooled with water prior to measuring the deflections and sets following the run of 5,000 turns.

The tensile specimen showed an elastic limit of 51,000 pounds per square inch. The metal in the rod from which this shaft was taken showed yielding and increased elongation under diminished loads after the elastic limit was passed.

The rotating test was discontinued before rupture of the shaft was completed, about 20 per cent. of the sectional area remaining intact, which showed a fine granular appearance when broken over the anvil.

The appearance of the metal ruptured while under rotating test was similar to the fracture of test No. 31, the surface having a smooth, battered appearance.

No. 32.—*O. H. Steel Bar. Mark*, 1.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

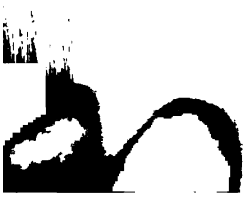
Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflection.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
53,000	0	0	*a*	.1997	.1605	.1996	.0391	.0001	
			b	.2000	.1610	.1999	.0389	.0001	
			c	.2001	.1613	.1999	.0386	.0002	
	1,000	1,000	*a*	.2031	.1579	.1976	.0397	.0055	
			b	.2021	.1580	.1981	.0401	.0040	
			c	.2016	.1584	.1978	.0394	.0038	
	1,000	2,000	*a*	.1933	.1524	.1927	.0403	.0006	
			b	.2026	.1557	.1957	.0400	.0069	
			c	.2062	.1564	.1967	.0403	.0095	
	1,000	3,000	*a*	.2036	.1530	.1939	.0409	.0097	
			b	.1960	.1528	.1931	.0403	.0049	
			c	.2075	.1549	.1954	.0405	.0121	
	1,000	4,000	*a*	.2104	.1539	.1946	.0407	.0158	
			b	.2022	.1533	.1940	.0407	.0082	
			c	.2053	.1528	.1936	.0408	.0117	
	1,000	5,000	*a*	.1908	.1473	.1822	.0349	.0086	
			b	.2104	.1530	.1939	.0409	.0165	
			c	.2079	.1526	.1937	.0411	.0142	
									Temperature of bar greatly increased. Cooled with water before measuring.
	5,000	10,000	*a*	.1864	.1448	.1855	.0407	.0009	
			b	.2235	.1623	.2009	.0386	.0226	
			c	.2047	.1525	.1929	.0404	.0118	
	5,000	15,000	*a*	.1856	.1433	.1843	.0410	.0013	
			b	.1881	.1444	.1856	.0412	.0025	
			c	.2265	.1629	.2028	.0399	.0237	
	5,000	20,000	*a*	.2137	.1673	.2063	.0390	.0074	
			b	.2191	.1732	.2117	.0385	.0074	
			c	.1294	.1348	.1742	.0394	.0052	
	3,100	23,100	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST No. 33.—*O. H. Steel from Rod No.* 1.

The conditions of test were the same in this experiment as with shaft No. 32, and the endurance under test nearly the same; the total number of rotations being 23,850 for this shaft, against 23,100 for the former.

The metal was ruptured on opposite sides of the shaft, the test being discontinued, leaving 40 per cent. of the sectional area intact.

When finally broken across the anvil the different parts of the fractured surface presented the characteristics previously noted.



NO. 55.—U. S. Steel Bar. Mark, 1.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
53,000	0	0	*a*	.1989	.1602	.1988	.0386	.0001	
			b	.1992	.1606	.1989	.0383	.0003	
			c	.1992	.1603	.1989	.0386	.0003	
	1,000	1,000	*a*	.2017	.1573	.1964	.0391	.0053	
			b	.2020	.1574	.1969	.0395	.0051	
			c	.2009	.1572	.1967	.0395	.0042	
	1,000	2,000	*a*	.2042	.1558	.1954	.0396	.0088	
			b	.1993	.1549	.1949	.0400	.0044	
			c	.2027	.1554	.1957	.0403	.0070	
	1,000	3,000	*a*	.2072	.1538	.1942	.0404	.0130	
			b	.2027	.1538	.1941	.0403	.0086	
			c	.2031	.1539	.1943	.0404	.0088	
	1,000	4,000	*a*	.1896	.1488	.1892	.0404	.0004	
			b	.1998	.1508	.1912	.0404	.0086	
			c	.2093	.1531	.1939	.0408	.0154	
	1,000	5,000	*a*	.1860	.1442	.1849	.0407	.0011	
			b	.2065	.1502	.1910	.0408	.0155	
			c	.2103	.1535	.1938	.0403	.0165	
	5,000	10,000	*a*	.2212	.1741	.2118	.0377	.0094	Temperature of bar greatly increased. Cooled with water.
			b	.1850	.1423	.1818	.0395	.0032	
			c	.1983	.1554	.1938	.0384	.0045	
	5,000	15,000	*a*	.1911	.1485	.1888	.0403	.0023	
			b	.2252	.1739	.2117	.0378	.0135	
			c	.1919	.1459	.1854	.0395	.0065	
	5,000	20,000	*a*	.1991	.1580	.1974	.0394	.0017	
			b	.1748	.1342	.1737	.0395	.0011	
			c	.2256	.1786	.2165	.0379	.0091	
	3,850	23,850	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 34.—*O. H. Steel from Rod No.* 1.

The shaft was run under the same maximum fiber stress as in the two preceding tests, 53,000 pounds per square inch.

It was annealed in an oil bath at the temperature of 589° to 595° F., after each of six consecutive runs of 5,000 rotations each.

After the final annealing and prior to rupture there were two intervals of rest of 32 and 66 days respectively.

The micrometer readings made before the shaft was rotated showed small permanent sets which increased after running up to the time of annealing.

After each annealing and the concurrent interval of rest the sets were at first small, but increased after the shaft had been run as before. The same phenomena were exhibited by the shaft following the longer periods of rest without annealing.

Low annealing temperatures were employed because it had been shown by other experiments upon alternate stresses by tension and compression that a disturbed elastic limit was sensibly restored by exposure to comparatively low annealing temperatures, hence it was desired to investigate the effect of such annealing upon the ultimate endurance of these shafts.

While in this test and the test of the following shaft, which was also annealed, there is evidence of greatly increased endurance, yet subsequent tests have introduced conflicting evidence upon this point.

The metal which fractured while rotating comprised 60 per cent. of the sectional area. This part of the surface presented a crescent-shape outline, with the dull leaden battered appearance typical to this manner of fracture. The fracture was completed over the anvil, the balance having a silky appearance.

No. 34.—*O. H. Steel Bar. Mark*, 1.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
53,000	0	0	*a*	.1978	.1584	.1977	.0393	.0001	
			b	.1980	.1588	.1977	.0389	.0003	
			c	.1978	.1586	.1974	.0388	.0004	
	1,000	1,000	*a*	.1991	.1578	.1971	.0393	.0020	
			b	.1984	.1578	.1971	.0393	.0013	
			c	.1984	.1573	.1967	.0394	.0017	
	1,000	2,000	*a*	.1968	.1563	.1958	.0395	.0010	
			b	.2006	.1569	.1964	.0395	.0042	
			c	.1991	.1567	.1961	.0394	.0030	
	1,000	3,000	*a*	.2009	.1559	.1960	.0401	.0049	
			b	.1987	.1560	.1958	.0398	.0029	
			c	.1994	.1571	.1958	.0387	.0036	
	2,000	5,000	*a*	.1933	.1529	.1930	.0401	.0003	
			b	.1998	.1546	.1946	.0400	.0052	
			c	.2018	.1550	.1949	.0399	.0069	
									Bar removed from machine and annealed at temperature of 589° F.
	0	5,000	*a*	.1988	.1596	.1985	.0389	.0003	Interval of rest, 4 days.
			b	.1983	.1590	.1981	.0391	.0002	
			c	.1974	.1570	.1972	.0402	.0002	
	1,000	6,000	*a*	.1983	.1589	.1982	.0393	.0001	
			b	.1988	.1587	.1978	.0391	.0010	
			c	.1978	.1578	.1969	.0391	.0009	
	1,000	7,000	*a*	.1978	.1582	.1978	.0396	.0	
			b	.1986	.1580	.1974	.0394	.0012	
			c	.1983	.1576	.1967	.0391	.0016	
	1,000	8,000	*a*	.1975	.1574	.1972	.0398	.0003	
			b	.1998	.1574	.1972	.0398	.0026	
			c	.1986	.1573	.1964	.0392	.0022	

No. 34.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
53,000	1,000	9,000	*a*	.1994	.1574	.1971	.0397	.0023	
			b	.2002	.1570	.1970	.0400	.0032	
			c	.1986	.1567	.1962	.0395	.0024	
	1,000	10,000	*a*	.1992	.1570	.1968	.0398	.0024	
			b	.1982	.1563	.1963	.0400	.0019	
			c	.1995	.1563	.1960	.0403	.0035	
									Bar annealed second time at temperature of 589° F. second annealing.
	0	10,000	*a*	.1986	.1593	.1985	.0392	.0001	
			b	.1984	.1580	.1982	.0392	.0002	
			c	.1978	.1585	.1975	.0390	.0003	
	1,000	11,000	*a*	.1982	.1582	.1979	.0397	.0003	
			b	.1994	.1581	.1977	.0396	.0017	
			c	.1983	.1580	.1971	.0391	.0012	
	1,000	12,000	*a*	.1999	.1580	.1975	.0395	.0024	
			b	.1996	.1574	.1972	.0398	.0024	
			c	.1984	.1571	.1966	.0395	.0018	
	1,000	13,000	*a*	.1972	.1573	.1970	.0397	.0002	
			b	.1985	.1569	.1966	.0397	.0019	
			c	.1993	.1566	.1963	.0397	.0030	
	1,000	14,000	*a*	.2008	.1574	.1972	.0398	.0036	
			b	.1989	.1571	.1967	.0396	.0022	
			c	.1989	.1564	.1961	.0397	.0028	
	1,000	15,000	*a*	.1973	.1566	.1963	.0397	.0009	
			b	.1944	.1563	.1961	.0398	.0023	
			c	.1999	.1561	.1959	.0398	.0040	
									Rested 36 hours, then annealed at temperature of 589° F. third annealing, and allowed to rest 30 hours.
53,000	0	15,000	*a*	.1987	.1594	.1986	.0392	.0001	
			b	.1985	.1590	.1983	.0393	.0002	
			c	.1975	.1582	.1973	.0391	.0002	
	1,000	16,000	*a*	.1981	.1584	.1978	.0394	.0003	
			b	.1995	.1582	.1976	.0394	.0019	
			c	.1982	.1576	.1968	.0392	.0014	

1,000	17,000	a	.1978	.1576	.1973	.0397	.0005			
		b	.1964	.1560	.1968	.0390	.0016			
		c	.1990	.1572	.1964	.0392	.0026			
1,000	18,000	a	.2006	.1573	.1972	.0399	.0024			
		b	.1999	.1569	.1968	.0399	.0031			
		c	.1988	.1566	.1962	.0396	.0020			
1,000	19,000	a	.1974	.1568	.1965	.0397	.0009			
		b	.1984	.1566	.1963	.0397	.0021			
		c	.1998	.1567	.1961	.0394	.0037			
1,000	20,000	a	.1960	.1559	.1958	.0399	.0002			
		b	.1993	.1563	.1961	.0399	.0032			
		c	.2000	.1562	.1960	.0398	.0040			
53,000						Bar straightened, and annealed at temperature of 580° F., fourth annealing.				
0	20,000	a	.1991	.1597	.1989	.0392	.0002			
		b	.1984	.1590	.1982	.0392	.0002			
		c	.1976	.1581	.1973	.0392	.0003			
1,000	21,000	a	.1994	.1588	.1981	.0393	.0013			
		b	.1985	.1579	.1972	.0393	.0013			
		c	.1986	.1573	.1967	.0394	.0019			
1,000	22,000	a	.2004	.1580	.1976	.0396	.0028			
		b	.1986	.1572	.1968	.0396	.0018			
		c	.1989	.1568	.1963	.0395	.0026			
1,000	23,000	a	.1998	.1570	.1969	.0399	.0029			
		b	.1984	.1566	.1963	.0397	.0021			
		c	.1998	.1563	.1961	.0398	.0037			
1,000	24,000	a	.1988	.1567	.1965	.0398	.0023			
		b	.1994	.1564	.1960	.0396	.0024			
		c	.2002	.1563	.1961	.0398	.0041			
1,000	25,000	a	.1979	.1565	.1963	.0397	.0017			
		b	.2016	.1565	.1964	.0399	.0052			
		c	.1993	.1559	.1958	.0399	.0035			
0	25,000	a	.1988	.1594	.1986	.0392	.0002			
		b	.1981	.1586	.1978	.0392	.0003			
		c	.1982	.1588	.1979	.0391	.0003			
						Bar straightened, and annealed at temperature of 580° F., fifth annealing; interval of rest, one day.				
1,000	26,000	a	.1977	.1580	.1976	.0396	.0001			
		b	.1993	.1576	.1972	.0396	.0021			
		c	.1997	.1575	.1971	.0396	.0016			

No. 34.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	27,000	*a*	.1988	.1574	.1972	.0398	.0016	
			b	.1984	.1568	.1965	.0397	.0019	
			c	.2096	.1567	.1965	.0398	.0131	
	1,000	28,000	*a*	.2007	.1575	.1972	.0397	.0035	
			b	.2001	.1570	.1968	.0398	.0033	
			c	.1990	.1568	.1964	.0396	.0026	
	1,000	29,000	*a*	.1993	.1571	.1968	.0397	.0025	
			b	.1984	.1563	.1962	.0399	.0022	
			c	.2000	.1564	.1962	.0398	.0038	
	1,000	30,000	*a*	.2013	.1572	.1970	.0398	.0043	
			b	.1997	.1566	.1965	.0399	.0032	
			c	.1992	.1561	.1961	.0400	.0031	
	0	30,000	*a*	.1988	.1596	.1966	.0390	.0002	Bar straightened, and annealed at temperature of 595° F., sixth annealing. Interval of rest, 2 days.
			b	.1983	.1590	.1960	.0390	.0003	
			c	.1983	.1590	.1960	.0390	.0003	
	1,000	31,000	*a*	.1986	.1585	.1979	.0394	.0007	
			b	.1984	.1578	.1972	.0394	.0012	
			c	.1990	.1578	.1973	.0395	.0017	
	1,000	32,000	*a*	.2002	.1579	.1974	.0395	.0028	
			b	.2001	.1575	.1971	.0396	.0030	
			c	.1990	.1570	.1966	.0396	.0024	
	1,000	33,000	*a*	.2010	.1575	.1973	.0398	.0037	
			b	.2000	.1571	.1968	.0397	.0032	
			c	.1990	.1568	.1964	.0396	.0026	
	1,000	34,000	*a*	.1983	.1571	.1967	.0396	.0016	
			b	.1984	.1566	.1963	.0397	.0021	
			c	.2002	.1568	.1964	.0396	.0038	
	1,000	35,000	*a*	.2004	.1570	.1968	.0398	.0036	
			b	.2008	.1570	.1966	.0396	.0042	
			c	.1994	.1564	.1961	.0397	.0033	Bar rested 32 days.

53,000	0	35,000	a	.1985	.1596	.1985	.0389	0.	
			b	.1988	.1594	.1985	.0391	.0003	
			c	.1987	.1594	.1983	.0389	.0004	
	1,000	36,000	a	.1972	.1576	.1970	.0394	.0002	
			b	.2004	.1578	.1972	.0394	.0032	
			c	.1995	.1576	.1971	.0395	.0024	
	1,000	37,000	a	.1978	.1571	.1969	.0398	.0009	
			b	.2012	.1573	.1970	.0387	.0042	
			c	.1994	.1569	.1966	.0397	.0028	
	1,000	38,000	a	.2009	.1571	.1971	.0400	.0038	
			b	.1988	.1565	.1964	.0399	.0024	
			c	.2001	.1568	.1964	.0396	.0037	
	0	38,000	a	.1992	.1599	.1991	.0392	.0001	Bar rested 66 days.
			b	.1984	.1590	.1982	.0392	.0002	
			c	.1980	.1585	.1978	.0393	.0002	
	1,000	39,000	a	.2006	.1583	.1979	.0396	.0027	
			b	.1990	.1574	.1972	.0398	.0018	
			c	.1989	.1573	.1968	.0395	.0021	
	1,000	40,000	a	.1966	.1569	.1965	.0396	.0001	
			b	.2002	.1570	.1966	.0396	.0036	
			c	.1997	.1570	.1965	.0395	.0032	
	14,850	54,850	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 35.—*O. H. Steel from Rod No.* 1.

Tested under 53,000 pounds per square inch maximum fiber stress and annealed at 595° F. after intervals of 10,000 rotations. Small permanent sets were displayed, due to loading before the shaft was rotated. After rotation the sets increased, but were diminished at each successive annealing.

A period of rest of 24 hours after the shaft had made 20,000 rotations was not followed by any material reduction in the sets, in this respect differing from the preceding shaft.

The test was discontinued when 40 per cent. of the sectional area was ruptured. The principal fracture extended inward from one side of the shaft; a small crack on the opposite side had begun to develop. The balance of the fracture when completed over the anvil displayed a granular appearance.

A few additional rotations would have completed the rupture of these shafts in the testing apparatus, the tests generally being discontinued at a time immediately preceding complete rupture, when there was violent wabbling of the shaft.

No. 35.—*O. H. Steel Bar. Mark*, 1.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
53,000	0	0	*a*	.1994	.1601	.1992	.0391	.0002	
			b	.1995	.1603	.1892	.0389	.0003	
			c	.1994	.1602	.1993	.0391	.0001	
	1,000	1,000	*a*	.1973	.1555	.1955	.0400	.0018	
			b	.1993	.1560	.1958	.0398	.0035	
			c	.2038	.1572	.1970	.0398	.0068	
	1,000	2,000	*a*	.2017	.1537	.1939	.0402	.0078	
			b	.1978	.1528	.1928	.0400	.0050	
			c	.2064	.1554	.1956	.0402	.0108	
	1,000	3,000	*a*	.1932	.1497	.1903	.0406	.0029	
			b	.2092	.1537	.1940	.0403	.0152	
			c	.2050	.1538	.1943	.0405	.0107	
	1,000	4,000	*a*	.2087	.1521	.1930	.0409	.0157	
			b	.1987	.1500	.1904	.0404	.0083	
			c	.2071	.1529	.1937	.0408	.0134	
	1,000	5,000	*a*	.1998	.1483	.1895	.0412	.0003	
			b	.2121	.1527	.1931	.0404	.0190	
			c	.2050	.1509	.1919	.0410	.0131	
	1,000	6,000	*a*	.2138	.1514	.1922	.0408	.0216	
			b	.2006	.1490	.1898	.0408	.0108	
			c	.2074	.1508	.1920	.0412	.0152	
	1,000	7,000	*a*	.2020	.1460	.1875	.0415	.0145	
			b	.2147	.1512	.1919	.0407	.0228	
			c	.2058	.1492	.1991	.0419	.0067	
	1,000	8,000	*a*	.1934	.1457	.1869	.0412	.0065	
			b	.2155	.1513	.1918	.0405	.0237	
			c	.2064	.1503	.1912	.0409	.0152	

No. 35.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	9,000	*a*	.2144	.1487	.1900	.0413	.0244	
			b	.2101	.1496	.1905	.0409	.0196	
			c	.2070	.1493	.1903	.0410	.0167	
	1,000	10,000	*a*	.2143	.1493	.1907	.0414	.0236	
			b	.1989	.1461	.1872	.0411	.0117	
			c	.2098	.1495	.1909	.0414	.0189	
									Bar annealed at temperature of 595° F.; first annealing. Interval of rest, 5 days.
53,000	0	10,000	*a*	.1997	.1605	.1994	.0389	.0003	
			b	.2001	.1609	.1998	.0389	.0003	
			c	.1999	.1606	.1995	.0389	.0004	
	1,000	11,000	*a*	.2001	.1594	.1988	.0394	.0013	
			b	.2008	.1598	.1992	.0394	.0016	
			c	.2004	.1595	.1988	.0393	.0016	
	1,000	12,000	*a*	.2019	.1582	.1979	.0397	.0040	
			b	.2004	.1584	.1980	.0396	.0024	
			c	.2012	.1583	.1978	.0395	.0034	
	1,000	13,000	*a*	.1986	.1559	.1959	.0400	.0027	
			b	.1993	.1559	.1958	.0399	.0035	
			c	.2038	.1570	.1969	.0399	.0069	
	1,000	14,000	*a*	.1951	.1535	.1937	.0402	.0014	
			b	.2058	.1558	.1957	.0399	.0101	
			c	.2036	.1558	.1959	.0401	.0077	
	1,000	15,000	*a*	.2039	.1532	.1936	.0404	.0103	
			b	.2067	.1546	.1947	.0401	.0120	
			c	.2038	.1541	.1945	.0404	.0093	
	1,000	16,000	*a*	.1902	.1486	.1892	.0406	.0010	
			b	.2047	.1523	.1927	.0404	.0120	
			c	.2082	.1544	.1948	.0404	.0134	
	1,000	17,000	*a*	.1933	.1503	.1910	.0407	.0023	
			b	.1982	.1501	.1906	.0405	.0076	
			c	.2100	.1544	.1945	.0401	.0155	

1,000	18,000	a	.1894	.1478	.1867	.0409	.0007		
		b	.2017	.1504	.1908	.0404	.0109		
		c	.2105	.1542	.1943	.0401	.0162		
1,000	19,000	a	.2110	.1523	.1933	.0410	.0177		
		b	.2010	.1508	.1914	.0406	.0096		
		c	.2068	.1523	.1929	.0406	.0139		
1,000	20,000	a	.1906	.1484	.1892	.0408	.0014	Rested 24 hours.	
		b	.1976	.1483	.1892	.0409	.0084		
		c	.2120	.1530	.1938	.0406	.0182		
0	20,000	a	.2048	.1528	.1929	.0401	.0119		
		b	.2035	.1531	.1924	.0403	.0131		
		c	.2061	.1535	.1941	.0406	.0120		
0	20,000	a	.1968	.1522	.1927	.0405	.0071	Bar straightened.	
		b	.2031	.1523	.1925	.0402	.0106		
		c	.2057	.1538	.1940	.0402	.0117		
0	20,000	a	.2002	.1509	.2002	.0398	0.	Bar straightened, and annealed at temperature of 650° F., second annealing. Interval of rest, 21 days.	
		b	.1991	.1500	.1980	.0389	.0002		
		c	.2004	.1513	.2002	.0410	.0002		
1,000	21,000	a	.1995	.1502	.1987	.0395	.0008		
		b	.1982	.1479	.1973	.0394	.0019		
		c	.2018	.1501	.1985	.0394	.0033		
1,000	22,000	a	.2000	.1508	.1985	.0397	.0035		
		b	.1992	.1503	.1951	.0399	.0041		
		c	.2042	.1505	.1966	.0401	.0076		
1,000	23,000	a	.1945	.1525	.1928	.0403	.0017		
		b	.2009	.1544	.1940	.0402	.0123		
		c	.2048	.1549	.1931	.0402	.0095		
1,000	24,000	a	.1925	.1510	.1918	.0408	.0007		
		b	.1989	.1512	.1916	.0404	.0073		
		c	.2001	.1544	.1949	.0405	.0142		
1,000	25,000	a	.2107	.1533	.1940	.0407	.0167		
		b	.2012	.1515	.1922	.0407	.0090		
		c	.2058	.1534	.1937	.0403	.0121		
1,000	26,000	a	.2049	.1513	.1921	.0406	.0128		
		b	.1975	.1488	.1894	.0406	.0081		
		c	.2100	.1537	.1942	.0405	.0158		
1,000	27,000	a	.2031	.1503	.1912	.0409	.0119		
		b	.2106	.1523	.1930	.0407	.0176		
		c	.2049	.1518	.1925	.0407	.0124		

28,000

No. 35.—*O. H. Steel Bar. Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	28,000	*a*	.2017	.1498	.1906	.0408	.0111	
			b	.1971	.1477	.1886	.0409	.0085	
			c	.2116	.1535	.1940	.0405	.0176	
	1,000	29,000	*a*	.1868	.1445	.1855	.0410	.0018	
			b	.2078	.1504	.1912	.0408	.0166	
			c	.2110	.1533	.1939	.0406	.0171	
	1,000	30,000	*a*	.1957	.1477	.1890	.0413	.0067	
			b	.2126	.1520	.1928	.0408	.0198	
			c	.2059	.1515	.1925	.0410	.0134	
53,000	0	30,000	*a*	.1995	.1601	.1993	.0392	.0002	Bar straightened, and annealed at temperature of 595° F., third annealing.
			b	.1994	.1601	.1992	.0391	.0002	
			c	.2008	.1615	.2005	.0390	.0003	
	1,000	31,000	*a*	.1987	.1586	.1981	.0395	.0006	
			b	.2010	.1589	.1983	.0394	.0027	
			c	.2015	.1598	.1993	.0395	.0022	
	1,000	32,000	*a*	.1980	.1559	.1958	.0399	.0022	
			b	.2040	.1567	.1966	.0399	.0074	
			c	.2025	.1575	.1974	.0399	.0051	
	1,000	33,000	*a*	.1983	.1534	.1937	.0403	.0046	
			b	.2065	.1550	.1952	.0402	.0113	
			c	.2038	.1556	.1957	.0401	.0081	
	1,000	34,000	*a*	.1916	.1507	.1912	.0405	.0004	
			b	.2005	.1517	.1921	.0404	.0084	
			c	.2082	.1549	.1953	.0404	.0129	
	1,000	35,000	*a*	.2103	.1532	.1940	.0408	.0163	
			b	.2018	.1521	.1927	.0406	.0091	
			c	.2055	.1535	.1939	.0404	.0116	
	1,000	36,000	*a*	.1948	.1492	.1901	.0409	.004[illegible]	
			b	.2105	.1530	.1935	.0405	.0176	
			c	.2059	.1538	.1941	.0403	.0118	

1,000	37,000	*a*	.2006	.1502	.1910	.0408	.0096
		b	.2107	.1534	.1937	.0403	.0170
		c	.2047	.1525	.1930	.0405	.0117
1,000	38,000	*a*	.2114	.1521	.1928	.0407	.0186
		b	.2061	.1519	.1925	.0406	.0136
		c	.2054	.1524	.1929	.0405	.0125
1,000	39,000	*a*	.1871	.1453	.1865	.0412	.0006
		b	.2005	.1503	.1910	.0407	.0145
		c	.2108	.1537	.1941	.0404	.0167
1,000	40,000	*a*	.2024	.1494	.1904	.0410	.0120
		b	.2109	.1529	.1931	.0402	.0178
		c	.2056	.1518	.1924	.0406	.0132
							Bar straightened, and annealed at temperature of 595° F. fourth annealing.
0	40,000	*a*	.2001	.1608	.2000	.0392	.0001
		b	.2003	.1610	.2000	.0390	.0003
		c	.1996	.1604	.1993	.0389	.0003
1,000	41,000	*a*	.2003	.1594	.1987	.0393	.0016
		b	.2000	.1594	.1987	.0393	.0013
		c	.2010	.1589	.1983	.0394	.0027
1,000	42,000	*a*	.2013	.1573	.1971	.0398	.0042
		b	.2034	.1578	.1975	.0397	.0059
		c	.2016	.1572	.1969	.0397	.0047
1,000	43,000	*a*	.2020	.1553	.1953	.0400	.0067
		b	.1988	.1540	.1943	.0402	.0045
		c	.2053	.1558	.1960	.0402	.0093
1,000	44,000	*a*	.2067	.1543	.1945	.0402	.0122
		b	.2055	.1547	.1949	.0402	.0106
		c	.2036	.1544	.1946	.0402	.0090
1,000	45,000	*a*	.1932	.1534	.1929	.0395	.0003
		b	.2091	.1548	.1942	.0394	.0149
		c	.2054	.1542	.1946	.0404	.0108
1,000	46,000	*a*	.2044	.1512	.1922	.0410	.0122
		b	.2096	.1536	.1940	.0404	.0156
		c	.2039	.1529	.1934	.0415	.0105
1,000	47,000	*a*	.1915	.1476	.1890	.0414	.0025
		b	.2111	.1537	.1938	.0401	.0173
		c	.2061	.1531	.1937	.0406	.0124
1,000	48,000	*a*	.2026	.1486	.1902	.0416	.0124
		b	.1974	.1487	.1898	.0411	.0076
		c	.2113	.1535	.1943	.0408	.0170

No. 35.—O. H. Steel Bar. Mark, 1—Continued.

Maximum fiber stress per square inch	Number of revolutions.		Measurement readings for deflections.				Deflections.	Sets.	Remarks.
	Successive	Total	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	40,000	*a*	.2135	.1425	.1874	.0439	.0262	
			b	.2074	.1514	.1932	.0418	.0142	
			c	.2077	.1507	.1924	.0417	.0153	
	400	40,400							Bar ruptured.

TEST No. 50.—*O. H. Steel from Rod No. 2.*

This shaft and the others from the same rod were run under the constant fiber stress of 50,000 pounds per square inch until ruptured.

The initial loading before rotating showed small sets, which were very much increased at the completion of 1,000 turns, and so continued to the end of the experiment.

A typical fracture occurred.

No. 50.—*O. H. Steel Bar. Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	0	*a*	.1993	.1614	.1991	.0377	.0002	
			b	.1995	.1619	.1992	.0373	.0003	
			c	.1996	.1618	.1991	.0373	.0005	
	1,000	1,000	*a*	.1933	.1523	.1907	.0384	.0026	
			b	.1989	.1533	.1919	.0386	.0070	
			c	.2063	.1556	.1940	.0384	.0143	
	1,000	2,000	*a*	.1973	.1486	.1872	.0386	.0101	
			b	.2138	.1539	.1926	.0387	.0212	
			c	.2059	.1519	.1907	.0388	.0152	
	1,000	3,000	*a*	.1829	.1406	.1797	.0391	.0032	
			b	.2161	.1525	.1911	.0386	.0250	
			c	.2116	.1528	.1912	.0389	.0204	
	1,000	4,000	*a*	.2173	.1493	.1888	.0395	.0285	
			b	.2098	.1514	.1904	.0390	.0194	
			c	.2070	.1509	.1895	.0386	.0175	
	1,000	5,000	*a*	.2117	.1492	.1886	.0394	.0231	
			b	.1959	.1463	.1854	.0391	.0105	
			c	.2135	.1526	.1911	.0385	.0224	
	5,000	10,000	*a*	.2240	.1749	.2113	.0364	.0127	
			b	.1848	.1428	.1807	.0379	.0041	
			c	.2018	.1566	.1938	.0370	.0080	
	5,600	15,600	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 51.—*O. H. Steel from Rod No. 2.*

Duplicate test of No. 50, excepting this shaft was annealed in an oil bath at the temperature of 500° F. upon the completion of 13,000 rotations.

Small sets were shown during the initial loading, which were increased, however, after rotating, again diminished after annealing, and then increased as the test progressed.

No. 51.—*O. H. Steel Bar. Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	0	*a*	.1992	.1621	.1990	.0369	.0002	
			b	.1994	.1617	.1990	.0373	.0004	
			c	.1993	.1618	.1989	.0371	.0004	
	1,000	1,000	*a*	.1898	.1505	.1889	.0384	.0009	
			b	.2036	.1553	.1934	.0381	.0102	
			c	.2075	.1549	.1934	.0385	.0141	
	1,000	2,000	*a*	.1839	.1495	.1824	.0329	.0015	
			b	.2066	.1520	.1903	.0383	.0163	
			c	.2130	.1530	.1915	.0385	.0215	
	1,000	3,000	*a*	.1820	.1410	.1802	.0392	.0018	
			b	.2083	.1514	.1899	.0385	.0184	
			c	.2142	.1522	.1904	.0382	.0238	
	1,000	4,000	*a*	.1810	.1404	.1799	.0395	.0011	
			b	.2087	.1495	.1883	.0391	.0154	
			c	.2170	.1518	.1908	.0388	.0262	
	1,000	5,000	*a*	.1922	.1428	.1823	.0395	.0099	
			b	.2312	.1528	.1919	.0391	.0293	
			c	.2079	.1489	.1877	.0388	.0202	
	5,000	10,000	*a*	.1749	.1361	.1743	.0382	.0006	
			b	.2281	.1815	.2177	.0362	.0104	
			c	.2008	.1586	.1958	.0372	.0050	
50,000	0	10,000	*a*	.1999	.1566	.1935	.0369	.0064	Bar rested 40 days.
			b	.2041	.1647	.2018	.0371	.0023	
			c	.2010	.1617	.1978	.0361	.0032	
	1,000	11,000	*a*	.2038	.1460	.1854	.0394	.0184	
			b	.2170	.1558	.1938	.0383	.0232	
			c	.2058	.1488	.1879	.0390	.0174	

	1,000	12,000	*a*	.2190	.1493	.1886	.0393	.0304	
			b	.2050	.1509	.1894	.0385	.0156	
			c	.2089	.1486	.1875	.0389	.0214	
	1,000	13,000	*a*	.1857	.1422	.1816	.0394	.0041	
			b	.1979	.1474	.1864	.0390	.0115	
			c	.2186	.1526	.1908	.0382	.0278	
50,000	0	13,000	*a*	.2006	.1636	.2006	.0370	0.	Bar heated in oil bath to 500° F. Kept at this temperature 1 hour, then allowed to cool slowly in bath, first annealing.
			b	.1996	.1624	.1995	.0371	.0001	
			c	.1991	.1619	.1989	.0370	.0002	
	1,000	14,000	*a*	.2042	.1606	.1985	.0379	.0057	
			b	.2018	.1598	.1974	.0376	.0044	
			c	.2005	.1581	.1958	.0377	.0047	
	1,000	15,000	*a*	.2057	.1545	.1931	.0386	.0126	
			b	.2076	.1567	.1949	.0382	.0127	
			c	.2040	.1541	.1924	.0383	.0116	
	1,000	16,000	*a*	.1921	.1486	.1873	.0367	.0048	
			b	.1985	.1503	.1889	.0386	.0096	
			c	.2133	.1537	.1918	.0381	.0215	
	1,000	17,000	*a*	.2165	.1516	.1905	.0389	.0260	
			b	.2072	.1526	.1913	.0387	.0159	
			c	.2069	.1503	.1889	.0386	.0180	
	1,000	18,000	*a*	.1809	.1388	.1784	.0396	.0025	
			b	.2146	.1518	.1907	.0389	.0239	
			c	.2135	.1508	.1900	.0392	.0235	
	1,500	19,500	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 52.—*O. H. Steel from Rod No.* 2.

The test was interrupted at the completion of 10,000 rotations, and rested without load for a period of 41 days. Loading and measuring the shaft after resting, the sets were very small, but were increased when measured after completing 1,000 rotations additional.

The shaft was annealed twice, after 13,000 and 23,000 rotations respectively, the effect of which was shown by the diminished sets as before mentioned in other tests.

Increased sets followed the renewal of the test, yet from the gradual manner of their increase the shaft was apparently slow to resume its former condition.

A typical fracture occurred.

No. 52.—*O. H. Steel Bar. Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	0	*a*	.2000	.1622	.1998	.0376	.0002	
			b	.1993	.1615	.1992	.0377	.0001	
			c	.1995	.1617	.1992	.0375	.0003	
	1,000	1,000	*a*	.2023	.1571	.1956	.0385	.0067	
			b	.2041	.1577	.1959	.0382	.0082	
			c	.2024	.1580	.1963	.0383	.0061	
	1,000	2,000	*a*	.2090	.1553	.1942	.0389	.0148	
			b	.1995	.1540	.1925	.0385	.0070	
			c	.2063	.1553	.1941	.0388	.0122	
	1,000	3,000	*a*	.2126	.1540	.1928	.0388	.0198	
			b	.2045	.1531	.1920	.0389	.0125	
			c	.2060	.1532	.1922	.0390	.0138	
	1,000	4,000	*a*	.2135	.1530	.1921	.0391	.0214	
			b	.2069	.1528	.1918	.0390	.0151	
			c	.2060	.1525	.1912	.0387	.0148	
	1,000	5,000	*a*	.1874	.1473	.1864	.0391	.0010	
			b	.1990	.1503	.1892	.0389	.0098	
			c	.2139	.1547	.1933	.0386	.0206	
	5,000	10,000	*a*	.1962	.1509	.1887	.0378	.0075	
			b	.2219	.1614	.1983	.0369	.0236	
			c	.2006	.1496	.1881	.0385	.0125	
	0	10,000	*a*	.2001	.1613	.1990	.0377	.0011	Bar rested 41 days.
			b	.2013	.1627	.2004	.0377	.0009	
			c	.1995	.1606	.1980	.0374	.0015	
	1,000	11,000	*a*	.2122	.1521	.1915	.0391	.0207	
			b	.2095	.1548	.1936	.0388	.0159	
			c	.2050	.1521	.1908	.0387	.0142	

No. 52.—*O. H. Steel Bar. Mark*, 2—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	1,000	12,000	*a*	.1942	.1470	.1868	.0398	.0074	
			b	.1974	.1488	.1879	.0391	.0095	
			c	.2150	.1531	.1919	.0388	.0231	
	1,000	13,000	*a*	.2031	.1496	.1880	.0394	.0151	
			b	.2164	.1538	.1929	.0391	.0235	
			c	.2046	.1499	.1890	.0391	.0156	
	0	13,000	*a*	.2005	.1634	.2003	.0369	.0002	Bar heated to 500° F. in oil bath, and kept at that temperature for 1 hour; cooled slowly in oil bath; first annealing.
			b	.2001	.1626	.2000	.0374	.0001	
			c	.1995	.1619	.1992	.0373	.0003	
	1,000	14,000	*a*	.1986	.1606	.1984	.0378	.0002	
			b	.2021	.1608	.1985	.0377	.0036	
			c	.2005	.1596	.1972	.0376	.0033	
	1,000	15,000	*a*	.1996	.1581	.1965	.0384	.0031	
			b	.2004	.1578	.1960	.0382	.0044	
			c	.2032	.1571	.1952	.0381	.0080	
	1,000	16,000	*a*	.2096	.1571	.1961	0390	.0134	
			b	.2031	.1568	.1952	.0384	.0079	
			c	.2034	.1550	.1933	.0383	.0101	
	1,000	17,000	*a*	.2035	.1538	.1926	0388	.0109	
			b	.1987	.1521	.1910	.0389	.0077	
			c	.2088	.1547	.1931	.0384	.0157	
	1,000	18,000	*a*	.2066	.1524	.1926	.0392	.0140	
			b	.1985	.1513	.1905	.0392	.0080	
			c	.2067	.1538	.1924	.0386	.0163	
	5,000	23,000	*a*	.2122	.1535	.1932	.0397	.0190	
			b	.1959	.1466	.1862	.0396	.0097	
			c	.2102	.1532	.1922	.0390	.0180	Bar annealed same manner as before at temperature of 500° F.; second annealing.

0	23,000	a	.2016	.1644	.2014	.0370	.0002		
		b	.1963	.1618	.1969	.0371	.0004		
		c	.1987	.1614	.1964	.0370	.0006		
1,000	24,000	a	.2016	.1610	.1990	.0380	.0026		
		b	.2021	.1590	.1969	.0379	.0052		
		c	.2005	.1589	.1966	.0379	.0038		
1,000	25,000	a	.2070	.1585	.1969	.0386	.0101		
		b	.1997	.1556	.1941	.0365	.0056		
		c	.2034	.1566	.1949	.0383	.0085		
1,000	26,000	a	.1993	.1494	.1887	.0393	.0006		
		b	.2059	.1535	.1925	.0390	.0134		
		c	.2080	.1564	.1939	.0385	.0141		
1,000	27,000	a	.2096	.1502	.1908	.0406	.0188		
		b	.2106	.1532	.1931	.0399	.0175		
		c	.2045	.1514	.1913	.0399	.0132		
850	27,850							Bar ruptured.	

TEST NO. 53.—*O. H. Steel from Rod No. 2.*

The shaft made 5,000 rotations and then rested without load 41 days. The sets which were observed after resting were small compared with those which preceded, but this apparent rigidity was lost when rotations began.

The shaft was annealed six times at 500° F. at intervals of 5,000 rotations, the first annealing being done when 8,000 rotations had been made.

A temporary reduction in the sets followed each annealing.

No. 53.—*O. H. Steel Bar. Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	0	*a*	.1994	.1614	.1993	.0379	.0001	
			b	.1995	.1614	.1992	.0378	.0008	
			c	.1998	.1614	.1995	.0381	.0003	
	1,000	1,000	*a*	.1984	.1544	.1932	.0388	.0052	
			b	.1988	.1548	.1935	.0387	.0053	
			c	.2066	.1566	.1956	.0390	.0110	
	1,000	2,000	*a*	.1914	.1500	.1893	.0393	.0021	
			b	.1983	.1520	.1911	.0391	.0072	
			c	.2107	.1546	.1940	.0394	.0167	
	1,000	3,000	*a*	.2023	.1495	.1890	.0395	.0133	
			b	.1968	.1494	.1888	.0394	.0080	
			c	.2128	.1539	.1932	.0393	.0196	
	1,000	4,000	*a*	.1840	.1426	.1825	.0399	.0015	
			b	.2076	.1511	.1905	.0394	.0171	
			c	.2132	.1534	.1929	.0395	.0203	
	1,000	5,000	*a*	.1850	.1425	.1821	.0396	.0029	
			b	.2136	.1527	.1918	.0391	.0218	
			c	.2107	.1524	.1919	.0395	.0188	
									Bar rested 41 days.
	0	5,000	*a*	.1994	.1607	.1985	.0378	.0009	
			b	.2004	.1618	.1996	.0378	.0008	
			c	.2006	.1617	.1996	.0379	.0010	
	1,000	6,000	*a*	.1979	.1500	.1895	.0395	.0084	
			b	.1985	.1511	.1903	.0392	.0082	
			c	.2111	.1549	.1935	.0386	.0176	
	1,000	7,000	*a*	.2103	.1522	.1918	.0396	.0185	
			b	.1991	.1508	.1903	.0395	.0088	
			c	.2086	.1530	.1925	.0395	.0161	

No. 53.—*O. H. Steel Bar. Mark*, 2—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	8,000	*a*	.2110	.1512	.1911	.0399	.0199	
			b	.1982	.1496	.1892	.0396	.0090	
			c	.2103	.1533	.1926	.0393	.0177	Heated to 500° F. in oil bath and kept at that temperature for one hour; cooled slowly in oil bath; first annealing.
	0	8,000	*a*	.2013	.1635	.2010	.0375	.0003	
			b	.1991	.1613	.1989	.0376	.0002	
			c	.1993	.1615	.1991	.0376	.0002	
	1,000	9,000	*a*	.1997	.1614	.1995	.0381	.0002	
			b	.1991	.1591	.1971	.0380	.0020	
			c	.2009	.1601	.1980	.0379	.0029	
	1,000	10,000	*a*	.2041	.1595	.1979	.0384	.0062	
			b	.2028	.1578	.1961	.0383	.0067	
			c	.2014	.1579	.1962	.0383	.0052	
	1,000	11,000	*a*	.1991	.1564	.1953	.0389	.0038	
			b	.2057	.1568	.1952	.0384	.0105	
			c	.2029	.1563	.1950	.0387	.0079	
	1,000	12,000	*a*	.1929	.1534	.1925	.0391	.0004	
			b	.2003	.1543	.1931	.0388	.0072	
			c	.2071	.1558	.1948	.0390	.0123	
	1,000	13,000	*a*	.1969	.1535	.1926	.0391	.0043	
			b	.2085	.1556	.1944	.0388	.0141	
			c	.2041	.1548	.1939	.0391	.0102	Bar annealed at 500° F. in same manner as before; second annealing.
	0	13,000	*a*	.2000	.1624	.1998	.0374	.0002	
			b	.1995	.1618	.1993	.0375	.0002	
			c	.1994	.1616	.1992	.0376	.0002	
	1,000	14,000	*a*	.1980	.1599	.1977	.0378	.0003	
			b	.2003	.1597	.1975	.0378	.0028	
			c	.2011	.1600	.1979	.0379	.0032	
	1,000	15,000	*a*	.2049	.1585	.1972	.0387	.0077	
			b	.2016	.1576	.1961	.0385	.0055	
			c	.2019	.1575	.1961	.0386	.0058	

1,000	16,000	*a*	.1934	.1541	.1929	.0388	.0005	
		b	.2026	.1556	.1943	.0387	.0083	
		c	.2050	.1568	.1955	.0387	.0095	
1,000	17,000	*a*	.2035	.1554	.1944	.0390	.0091	
		b	.2059	.1563	.1949	.0386	.0110	
		c	.2081	.1569	.1945	.0386	.0086	
1,000	18,000	*a*	.1919	.1530	.1910	.0390	.0009	
		b	.2039	.1550	.1936	.0386	.0003	
		c	.2062	.1558	.1946	.0388	.0116	
								Bar annealed at 500° F. in same manner as before; third annealing.
0	18,000	*a*	.2000	.1623	.1999	.0376	.0001	
		b	.2004	.1626	.2002	.0376	.0002	
		c	.1990	.1613	.1968	.0375	.0002	
1,000	19,000	*a*	.1999	.1595	.1976	.0381	.0023	
		b	.2027	.1598	.1978	.0380	.0049	
		c	.2008	.1590	.1970	.0380	.0038	
1,000	20,000	*a*	.2020	.1569	.1956	.0387	.0064	
		b	.1990	.1562	.1947	.0385	.0043	
		c	.2044	.1571	.1958	.0387	.0086	
1,000	21,000	*a*	.1928	.1533	.1923	.0390	.0005	
		b	.2032	.1560	.1946	.0386	.0086	
		c	.2057	.1565	.1953	.0388	.0104	
1,000	22,000	*a*	.1962	.1541	.1933	.0392	.0029	
		b	.2070	.1564	.1951	.0387	.0119	
		c	.2037	.1558	.1947	.0389	.0090	
1,000	23,000	*a*	.1959	.1538	.1930	.0392	.0029	
		b	.2070	.1560	.1947	.0387	.0123	
		c	.2045	.1555	.1945	.0390	.0100	
								Bar annealed at 500° F. in same manner as before; fourth annealing.
0	23,000	*a*	.2004	.1624	.2003	.0379	.0001	
		b	.1995	.1617	.1993	.0376	.0002	
		c	.1994	.1615	.1991	.0376	.0003	
1,000	24,000	*a*	.2013	.1589	.1972	.0383	.0041	
		b	.1992	.1580	.1961	.0381	.0031	
		c	.2026	.1588	.1970	.0382	.0056	
1,000	25,000	*a*	.1944	.1548	.1936	.0388	.0008	
		b	.2045	.1568	.1953	.0385	.0092	
		c	.2040	.1571	.1957	.0386	.0083	

No. 53.—*O. H. Steel Bar. Mark*, 2—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	26,000	*a*	.1946	.1548	.1938	.0390	.0008	
			b	.1991	.1551	.1938	.0387	.0053	
			c	.2061	.1567	.1954	.0387	.0107	
	1,000	27,000	*a*	.1987	.1553	.1941	.0388	.0046	
			b	.2066	.1567	.1953	.0386	.0113	
			c	.2032	.1558	.1945	.0387	.0087	
	1,000	28,000	*a*	.1923	.1530	.1918	.0388	.0005	
			b	.2016	.1547	.1924	.0387	.0092	
			c	.2067	.1564	.1951	.0387	.0116	
									Bar annealed at 500° F. in same manner as before; fifth annealing.
	0	28,000	*a*	.2000	.1626	.2000	.0274	0.	
			b	.1995	.1619	.1992	.0378	.0003	
			c	.2001	.1620	.1997	.0377	.0004	
	1,000	29,000	*a*	.2038	.1590	.1973	.0383	.0065	
			b	.2027	.1588	.1966	.0383	.0061	
			c	.2017	.1580	.1966	.0386	.0051	
	1,000	30,000	*a*	.1942	.1552	.1936	.0384	.0006	
			b	.2008	.1561	.1918	.0387	.0090	
			c	.2053	.1570	.1959	.0383	.0094	
	1,000	31,000	*a*	.1931	.1537	.1925	.0388	.0006	
			b	.2039	.1560	.1946	.0380	.0093	
			c	.2056	.1569	.1956	.0387	.0100	
	1,000	32,000	*a*	.2051	.1560	.1949	.0389	.0102	
			b	.2055	.1566	.1952	.0386	.0103	
			c	.2032	.1557	.1945	.0388	.0087	
	1,000	33,000	*a*	.2055	.1559	.1948	.0380	.0107	
			b	.2056	.1561	.1949	.0358	.0107	
			c	.2034	.1553	.1044	.0391	.0090	
									Bar annealed at 500° F. in same manner as before; sixth annealing.
	0	33,000	*a*	.2005	.1629	.2004	.0375	.0001	
			b	.2001	.1623	.1999	.0376	.0002	
			c	.1991	.1618	1989	.0376	.0002	

1,000	34,000	*a*	.2043	.1588	.1972	.0384	.0071	
		b	.2038	.1583	.1966	.0383	.0067	
		c	.2015	.1574	.1959	.0385	.0056	
1,000	35,000	*a*	.2018	.1563	.1952	.0389	.0066	
		b	.1989	.1551	.1939	.0388	.0050	
		c	.2033	.1566	.1955	.0389	.0098	
1,000	36,000	*a*	.1991	.1554	.1943	.0389	.0048	
		b	.1989	.1548	.1936	.0388	.0053	
		c	.2062	.1564	.1954	.0390	.0108	
1,000	37,000	*a*	.1945	.1544	.1937	.0393	.0008	
		b	.1993	.1545	.1935	.0390	.0058	
		c	.2064	.1560	.1952	.0392	.0112	
1,000	38,000	*a*	.2012	.1551	.1941	.0390	.0071	
		b	.1985	.1539	.1929	.0390	.0056	
		c	.2069	.1562	.1952	.0390	.0117	
10,300	48,300	.....	.....	.....	.....	.....	.....	Bar ruptured.

No 54.—*O. H. Steel Bar. Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Loaded and annealed in the same manner as test No. 53.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	0	*a*	.1992	.1615	.1989	.0374	.0003	
			b	.1995	.1618	.1992	.0374	.0003	
			c	.1994	.1617	.1990	.0373	.0004	
	1,000	1,000	*a*	.2043	.1581	.1962	.0381	.0081	
			b	.1999	.1565	.1949	.0384	.0050	
			c	.2027	.1582	.1961	.0379	.0066	
	1,000	2,000	*a*	.1946	.1528	.1912	.0384	.0032	
			b	.2096	.1544	.1930	.0386	.0166	
			c	.2043	.1552	.1937	.0385	.0106	
	1,000	3,000	*a*	.1990	.1514	.1902	.0388	.0068	
			b	.2115	.1536	.1923	.0387	.0192	
			c	.2044	.1533	.1918	.0385	.0126	
	1,000	4,000	*a*	.2055	.1506	.1896	.0390	.0159	
			b	.2124	.1529	.1917	.0388	.0207	
			c	.2044	.1518	.1906	.0388	.0188	
	1,000	5,000	*a*	.2114	.1524	.1915	.0391	.0199	
			b	.1964	.1475	.1868	.0393	.0096	
			c	.2103	.1533	.1919	.0386	.0184	
	0	5,000	*a*	.1993	.1616	.1991	.0375	.0002	Bar rested 40 days.
			b	.1996	.1614	.1989	.0375	.0007	
			c	.2002	.1618	.1992	.0374	.0010	
	1,000	6,000	*a*	.2075	.1529	.1916	.0387	.0159	
			b	.2092	.1534	.1920	.0386	.0172	
			c	.2053	.1539	.1924	.0385	.0129	
	1,000	7,000	*a*	.1962	.1486	.1878	.0393	.0084	
			b	.1966	.1479	.1868	.0389	.0098	
			c	.2141	.1545	.1932	.0387	.0209	

1,000	8,000	*a*	.2130	.1513	.1906	.0393	.0224	
		b	.2092	.1519	.1906	.0387	.0186	
		c	.2071	.1518	.1907	.0389	.0164	
								Heated at 500° F. in oil bath, and kept at that temperature for 1 hour; cooled slowly in oil bath; first annealing.
0	8,000	*a*	.2003	.1630	.2001	.0371	.0002	
		b	.1992	.1619	.1991	.0372	.0001	
		c	.1994	.1619	.1992	.0373	.0002	
1,000	9,000	*a*	.1992	.1615	.1990	.0375	.0002	
		b	.1995	.1603	.1976	.0373	.0019	
		c	.2005	.1603	.1980	.0377	.0025	
1,000	10,000	*a*	.2011	.1592	.1972	.0380	.0039	
		b	.2089	.1585	.1962	.0377	.0077	
		c	.2009	.1580	.1959	.0379	.0050	
1,000	11,000	*a*	.2012	.1569	.1951	.0382	.0061	
		b	.2064	.1576	.1954	.0378	.0110	
		c	.2024	.1563	.1944	.0381	.0080	
1,000	12,000	*a*	.1915	.1527	.1910	.0383	.0005	
		b	.2027	.1534	.1919	.0385	.0108	
		c	.2073	.1556	.1940	.0384	.0133	
1,000	13,000	*a*	.2107	.1557	.1944	.0387	.0163	
		b	.2036	.1538	.1924	.0386	.0112	
		c	.2047	.1541	.1926	.0385	.0121	
								Bar annealed same manner as before at 500° F.; second annealing.
0	13,000	*a*	.2006	.1637	.2006	.0369	0.	
		b	.1988	.1620	.1986	.0366	.0002	
		c	.1985	.1618	.1984	.0371	.0001	
1,000	14,000	*a*	.2038	.1618	.1985	.0367	.0053	
		b	.1988	.1587	.1963	.0376	.0025	
		c	.2003	.1589	.1965	.0376	.0038	
1,000	15,000	*a*	.2065	.1580	.1960	.0380	.0105	
		b	.2035	.1561	.1943	.0382	.0092	
		c	.2024	.1563	.1943	.0380	.0081	
1,000	16,000	*a*	.2079	.1571	.1953	.0382	.0126	
		b	.1995	.1540	.1925	.0385	.0070	
		c	.2043	.1554	.1937	.0383	.0106	
1,000	17,000	*a*	.1933	.1522	.1908	.0386	.0025	
		b	.2093	.1547	.1931	.0384	.0162	
		c	.2049	.1451	.1933	.0382	.0116	

No. 54.—*O. H. Steel Bar. Mark*, 2—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	18,000	*a*	.1965	.1525	.1912	.0387	.0053	
			b	.2101	.1550	.1933	.0383	.0168	
			c	.2043	.1543	.1928	.0385	.0115	
									Bar annealed same manner as before at 500° F.; third annealing.
	0	18,000	*a*	.1998	.1625	.1697	.0372	.0001	
			b	.1987	.1613	.1585	.0372	.0002	
			c	.2012	.1627	.2000	.0373	.0012	
	1,000	19,000	*a*	.2019	.1592	.1969	.0377	.0050	
			b	.1989	1574	.1952	.0378	.0037	
			c	.2029	.1592	.1970	.0378	.0059	
	1 000	20,000	*a*	.2075	.1570	.1956	.0386	.0119	
			b	.2008	.1553	.1936	.0383	.0072	
			c	.1988	.1561	.1944	.0383	.0044	
	1,000	21,000	*a*	.2061	.1553	.1940	.0387	.0121	
			b	.1982	.1526	.1913	.0387	.0069	
			c	.2065	.1555	.1941	.0386	.0124	
	1,000	22,000	*a*	.1932	.1518	.1905	.0387	.0027	
			b	.2096	.1544	.1931	.0387	.0165	
			c	.2056	.1545	.1932	.0387	.0124	
	1,000	23,000	*a*	.1977	.1534	.1917	.0383	.0060	
			b	.2103	.1552	.1985	.0383	.0168	
			c	.2088	.1541	.1926	.0385	.0112	
									Bar annealed same manner as before at 500° F.; fourth annealing.
	0	23,000	*a*	.1993	.1618	.1992	.0374	.0001	
			b	.2005	.1634	.2003	.0369	.0002	
			c	.1989	.1613	.1986	.0378	.0003	
	1,000	24,000	*a*	.2006	.1580	.1959	.0379	.0047	
			b	.2045	.1588	.1966	.0378	.0079	
			c	.2014	.1579	.1958	.0379	.0056	
	1,000	25,000	*a*	.1953	.1544	.1929	.0385	.0024	
			b	.2086	.1542	.1925	.0383	.0161	
				.2070	.1564	.1947	.0383	.0138	

1,000	26,000	*a*	.1979	.1538	.1921	.0383	.0058
		b	.1981	.1525	.1910	.0385	.0071
		c	.2083	.1554	.1940	.0386	.0143
1,000	27,000	*a*	.1971	.1532	.1918	.0386	.0053
		b	.2097	.1556	.1910	.0384	.0157
		c	.2042	.1549	.1933	.0384	.0109
1 000	28,000	*a*	.2090	.1562	.1946	.0384	.0144
		b	.1992	.1530	.1914	.0384	.0078
		c	.2056	.1540	.1935	.0386	.0121
							Bar annealed same manner as before at 500° F.; fifth annealing.
0	28,000	*a*	.2008	.1635	.2007	.0372	.0001
		b	.1987	.1613	.1985	.0372	.0002
		c	.1994	.1620	.1991	.0371	.0003
1,000	29,000	*a*	.2012	.1572	.1953	.0381	.0059
		b	.2056	.1568	.1949	.0381	.0106
		c	.2024	.1569	.1950	.0381	.0074
1,000	30,000	*a*	.2082	.1567	.1952	.0385	.0130
		b	.1999	.1542	.1927	.0385	.0072
		c	.2044	.1558	.1940	.0382	.0104
1,000	31,000	*a*	.1998	.1546	.1929	.0383	.0069
		b	.1982	.1524	.1906	.0382	.0076
		c	.2084	.1560	.1944	.0384	.0040
1,000	32,000	*a*	.1950	.1534	.1917	.0383	.0033
		b	.1982	.1522	.1907	.0385	.0075
		c	.2088	.1558	.1942	.0384	.0146
1,000	33,000	*a*	.1940	.1521	.1909	.0388	.0031
		b	.2097	.1548	.1933	.0385	.0164
		c	.2052	.1548	.1933	.0385	.0119
							Bar annealed same manner as before, at 500° F.; sixth annealing.
0	33,000	*a*	.1996	.1623	.1994	.0371	.0002
		b	.1999	.1627	.1997	.0370	.0002
		c	.1997	.1623	.1994	.0371	.0003
1,000	34,000	*a*	.1939	.1544	.1927	.0383	.0012
		b	.2066	.1566	.1947	.0381	.0119
		c	.2042	.1568	.1951	.0383	.0091
1,000	35,000	*a*	.2029	.1547	.1933	.0386	.0096
		b	.1979	.1525	.1911	.0386	.0068
		c	.2076	.1557	.1942	.0385	.0134

No. 54.—*O. H. Steel Bar. Mark*, 2—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	1,000	36,000	*a*	.2069	.1550	.1939	.0389	.0130	
			b	.1986	.1534	.1917	.0383	.0069	
			c	.2065	.1561	.1943	.0382	.0122	
	1,000	37,000	*a*	.1955	.1526	.1913	.0387	.0042	
			b	.2099	.1550	.1936	.0386	.0163	
			c	.2048	.1546	.1933	.0387	.0115	
	1,000	38,000	*a*	.1920	.1508	.1898	.0390	.0022	
			b	.2102	.1544	.1930	.0386	.0172	
			c	.2060	.1549	.1934	.0385	.0126	
	6,900	44,900	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 55.—*O. H. Steel from Rod No. 3.*

Shafts from rod No. 3 were each tested under 45,000 pounds per square inch maximum fiber stress.

The test of this shaft was continuous, excepting the intervals of time necessary to make observations upon its deflection and the permanent sets; also the shaft rested over night at the close of 50,000 rotations.

There was a gradual increase both in the maximum set and the total deflection. Thus we observe the maximum set ".0004 and the mean deflection ".0333 under the initial load, both of which values increased after the shaft had been running, and finally the last observations made prior to rupture gave the values ".0083 and ".0346 respectively.

No. 55.—*O. H. Steel Bar. Mark*, 3.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45, 000	0	0	*a*	.1998	.1662	.1995	.0373	.0003	
			b	.2001	.1664	.1997	.0333	.0004	
			c	.2001	.1664	.1997	.0333	.0004	
	1, 000	1, 000	*a*	.2005	.1654	.1989	.0335	.0016	
			b	.2009	.1657	.1991	.0334	.0018	
			c	.2004	.1656	.1990	.0334	.0014	
	1, 000	2, 000	*a*	.2016	.1647	.1984	.0337	.0032	
			b	.2008	.1650	.1986	.0336	.0022	
			c	.2008	.1648	.1984	.0336	.0024	
	1, 000	3, 000	*a*	.1976	.1636	.1972	.0336	.0004	
			b	.2020	.1643	.1981	.0338	.0039	
			c	.2015	.1642	.1981	.0339	.0034	
	1, 000	4, 000	*a*	.1996	.1632	.1968	.0336	.0028	
			b	.1999	.1635	.1973	.0338	.0026	
			c	.2028	.1639	.1978	.0339	.0050	
	1, 000	5, 000	*a*	.1971	.1625	.1965	.0340	.0006	
			b	.2001	.1636	.1972	.0337	.0029	
			c	.2031	.1640	.1978	.0338	.0053	
	5, 000	10, 000	*a*	.2007	.1618	.1960	.0342	.0047	
			b	.1996	.1628	.1963	.0340	.0033	
			c	.2040	.1630	.1970	.0340	.0070	
	10, 000	20, 000	*a*	.2040	.1620	.1962	.0342	.0078	
			b	.2040	.1630	.1969	.0339	.0071	
			c	.2024	.1621	.1964	.0343	.0060	
	10, 000	30, 000	*a*	.2049	.1621	.1964	.0343	.0085	
			b	.2033	.1626	.1968	.0342	.0065	
			c	.2024	.1621	.1964	.0343	.0060	

10,000	40,000	a	.2024	.1615	.1958	.0343	.0066			
		b	.2051	.1626	.1968	.0342	.0083			
		c	.2025	.1619	.1961	.0348	.0064			
10,000	50,000	a	.2049	.1620	.1961	.0341	.0068			
		b	.2039	.1624	.1967	.0343	.0072			
		c	.2027	.1616	.1961	.0345	.0066			
10,000	60,000	a	.2014	.1610	.1956	.0346	.0058			
		b	.2048	.1624	.1968	.0344	.0080			
		c	.2025	.1618	.1961	.0343	.0064			
10,000	70,000	a	.2005	.1615	.1956	.0341	.0049			
		b	.2055	.1627	.1970	.0343	.0085			
		c	.2022	.1615	.1960	.0345	.0062			
10,000	80,000	a	.1931	.1589	.1935	.0346	—.0004			
		b	.2021	.1614	.1959	.0345	.0062			
		c	.2053	.1621	.1965	.0344	.0088			
10,000	90,000	a	.2047	.1616	.1961	.0345	.0086			
		b	.2003	.1614	.1960	.0346	.0043			
		c	.2028	.1613	.1958	.0345	.0070			
10,000	100,000	a	.1931	.1580	.1926	.0346	.0005			
		b	.2033	.1608	.1953	.0345	.0080			
		c	.2040	.1610	.1956	.0346	.0084			
10,000	110,000	a	.1964	.1592	.1944	.0352	.0020			
		b	.2053	.1616	.1961	.0345	.0092			
		c	.2029	.1613	.1959	.0346	.0070			
10,000	120,000	a	.2041	.1612	.1958	.0346	.0083			
		b	.1996	.1610	.1955	.0345	.0041			
		c	.2032	.1611	.1959	.0348	.0073			
7,500	127,500									Bar ruptured.

TEST No. 56.—*O. H. steel from rod No.* 3.

Annealed six times at 500° F., at intervals of 10,000 rotations, the final annealing being done when 63,000 rotations were completed. After a further run of 53,900 rotations the shaft ruptured.

The effect of annealing on the magnitude of the sets was the same as recorded in previous tests.

No. 56.—*O. H. steel bar. Mark, 3.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.1996	.1661	.1994	.0333	.0002	
			b	.1996	.1660	.1994	.0334	.0002	
			c	.1998	.1662	.1994	.0332	.0004	
	1,000	1,000	*a*	.1988	.1650	.1985	.0335	.0003	
			b	.2003	.1653	.1989	.0336	.0014	
			c	.2003	.1653	.1988	.0335	.0015	
	1,000	2,000	*a*	.2010	.1647	.1984	.0337	.0026	
			b	.2001	.1650	.1986	.0336	.0015	
			c	.2007	.1650	.1985	.0335	.0022	
	1,000	3,000	*a*	.1976	.1636	.1974	.0338	.0002	
			b	.1997	.1643	.1980	.0337	.0017	
			c	.2016	.1647	.1983	.0336	.0033	
	1,000	4,000	*a*	.1976	.1633	.1970	.0337	.0006	
			b	.2015	.1643	.1981	.0338	.0034	
			c	.2014	.1643	.1980	.0337	.0034	
	1,000	5,000	*a*	.1975	.1629	.1968	.0339	.0007	
			b	.1995	.1638	.1976	.0338	.0019	
			c	.2024	.1640	.1978	.0338	.0046	
	5,000	10,000	*a*	.2013	.1625	.1966	.0341	.0047	
			b	.1993	.1628	.1969	.0341	.0024	
			c	.2027	.1632	.1971	.0339	.0056	
	0	10,000	*a*	.2000	.1662	.1999	.0337	.0001	Bar rested 39 days.
			b	.1995	.1659	.1994	.0335	.0001	
			c	.1996	.1662	.1993	.0331	.0003	
	1,000	11,000	*a*	.2010	.1641	.1974	.0333	.0036	
			b	.2018	.1645	.1981	.0336	.0037	
			c	.2011	.1642	.1978	.0336	.0043	

No. 56.—*O. H. steel bar. Mark, 3*—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	1,000	12,000	*a*	.1989	.1631	.1970	.0339	.0019	
			b	.2023	.1644	.1980	.0336	.0043	
			c	.2014	.1641	.1976	.0335	.0038	
	1,000	13,000	*a*	.1970	.1626	.1964	.0338	.0006	
			b	.1998	.1636	.1973	.0337	.0025	
			c	.2029	.1639	.1976	.0337	.0053	
	0	13,000	*a*	.2006	.1673	.2005	.0332	.0001	Bar heated in oil bath to 500° F., and kept at that temperature 1 hour; cooled slowly in oil bath; first annealing.
			b	.1998	.1666	.1997	.0331	.0001	
			c	.1990	.1658	.1988	.0330	.0002	
	1,000	14,000	*a*	.2010	.1674	.2004	.0330	.0006	
			b	.2000	.1664	.1996	.0332	.0004	
			c	.1993	.1654	.1986	.0332	.0007	
	1,000	15,000	*a*	.2000	.1665	.1998	.0333	.0002	
			b	.1999	.1660	.1993	.0333	.0006	
			c	.1999	.1652	.1985	.0333	.0014	
	1,000	16,000	*a*	.2014	.1663	.1996	.0333	.0018	
			b	.2005	.1658	.1992	.0334	.0013	
			c	.1998	.1647	.1982	.0335	.0016	
	1,000	17,000	*a*	.2013	.1658	.1992	.0334	.0021	
			b	.2008	.1656	.1990	.0334	.0018	
			c	.2001	.1647	.1982	.0335	.0019	
	1,000	18,000	*a*	.1997	.1652	.1987	.0335	.0010	
			b	.1998	.1650	.1986	.0336	.0012	
			c	.2010	.1647	.1982	.0335	.0028	
	5,000	23,000	*a*	.2021	.1642	.1980	.0338	.0041	
			b	.2015	.1647	.1984	.0337	.0031	
			c	.2010	.1640	.1977	.0337	.0033	
	0	23,000	*a*	.2002	.1671	.2002	.0331	0.	Bar annealed same manner as before at temperature of 500° F.; second annealing.
			b	.1991	.1658	.1989	.0331	.0002	
			c	.1998	.1664	.1994	.0330	.0002	

1,000	24,000	a	.2007	.1666	.1998	.0332	.0009		
		b	.1983	.1657	.1989	.0332	.0004		
		c	.1988	.1658	.1991	.0333	.0007		
1,000	25,000	a	.1998	.1658	.1992	.0334	.0006		
		b	.2000	.1665	.1988	.0333	.0012		
		c	.2001	.1653	.1987	.0334	.0014		
1,000	26,000	a	.2012	.1655	.1990	.0335	.0022		
		b	.2003	.1652	.1987	.0335	.0016		
		c	.2002	.1648	.1984	.0336	.0018		
1,000	27,000	a	.2016	.1654	.1989	.0335	.0027		
		b	.1998	.1650	.1986	.0336	.0012		
		c	.2005	.1648	.1983	.0335	.0022		
1,000	28,000	a	.2016	.1652	.1986	.0334	.0030		
		b	.1997	.1648	.1984	.0336	.0013		
		c	.2005	.1645	.1981	.0336	.0024		
5,000	33,000	a	.2000	.1639	.1977	.0338	.0023		
		b	.2016	.1643	.1984	.0338	.0032		
		c	.2008	.1641	.1977	.0336	.0031		
								Bar annealed same manner as before at temperature of 500 F.; third annealing.	
0	33,000	a	.1995	.1663	.1994	.0331	.0001		
		b	.1998	.1665	.1996	.0331	.0002		
		c	.1998	.1668	.1997	.0329	.0001		
1,000	34,000	a	.1995	.1656	.1990	.0334	.0005		
		b	.2005	.1656	.1981	.0335	.0012		
		c	.2001	.1655	.1980	.0334	.0042		
1,000	35,000	a	.1990	.1650	.1984	.0334	.0006		
		b	.2009	.1655	.1989	.0334	.0020		
		c	.2006	.1650	.1984	.0334	.0022		
1,000	36,000	a	.2008	.1647	.1984	.0337	.0024		
		b	.1998	.1649	.1985	.0336	.0013		
		c	.2010	.1647	.1983	.0336	.0027		
1,000	37,000	a	.2009	.1647	.1984	.0337	.0025		
		b	.2013	.1652	.1987	.0335	.0026		
		c	.2006	.1643	.1981	.0338	.0025		
1,000	38,000	a	.2021	.1648	.1984	.0336	.0037		
		b	.2005	.1649	.1985	.0336	.0020		
		c	.2008	.1643	.1980	.0337	.0028		

No. 56.—*O. H. steel bar. Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	5,000	43,000	*a*	.2019	.1638	.1977	.0339	.0042	
			b	.2017	.1645	.1982	.0337	.0035	
			c	.2011	.1638	.1976	.0338	.0035	
									Bar annealed same manner as before at temperature of 500° F.; fourth annealing.
	0	43,000	*a*	.2002	.1671	.2001	.0330	.0001	
			b	.1995	.1661	.1994	.0333	.0001	
			c	.1996	.1662	.1994	.0332	.0002	
	1,000	44,000	*a*	.2013	.1661	.1994	.0333	.0019	
			b	.1999	.1659	.1990	.0331	.0009	
			c	.2000	.1652	.1986	.0334	.0014	
	1,000	45,000	*a*	.2018	.1656	.1990	.0334	.0028	
			b	.2001	.1654	.1988	.0334	.0013	
			c	.2003	.1648	.1982	.0334	.0021	
	1,000	46,000	*a*	.1987	.1649	.1983	.0334	.0004	
			b	.1998	.1650	.1985	.0335	.0013	
			c	.2018	.1644	.1982	.0338	.0031	
	1,000	47,000	*a*	.2011	.1652	.1985	.0333	.0026	
			b	.1997	.1647	.1984	.0337	.0013	
			c	.2011	.1645	.1980	.0335	.0031	
	1,000	48,000	*a*	.2006	.1648	.1983	.0335	.0023	
			b	.1998	.1646	.1983	.0337	.0015	
			c	.2012	.1642	.1979	.0337	.0033	
	5,000	53,000	*a*	.1992	.1638	.1973	.0335	.0009	
			b	.1997	.1640	.1979	.0339	.0018	
			c	.2021	.1641	.1978	.0337	.0043	
									Bar annealed same manner as before at 500° F.; fifth annealing.
	0	53,000	*a*	.2005	.1675	.2004	.0329	.0001	
			b	.1995	.1661	.1994	.0333	.0001	
			c	.1995	.1664	.1995	.0331	0.	
	1,000	54,000	*a*	.1992	.1660	.1992	.0332	0.	
			b	.1988	.1656	.1980	.0332	.0009	
			c	.2006	.1664	.1987	.0336	.0016	

1,000	55,000	*a*	.2001	.1655	.1989	.0334	.0012	
		b	.1998	.1652	.1985	.0333	.0013	
		c	.2009	.1649	.1984	.0335	.0025	
1,000	56,000	*a*	.2021	.1656	.1989	.0333	.0032	
		b	.2001	.1655	.1987	.0332	.0014	
		c	.2005	.1647	.1982	.0335	.0023	
1,000	57,000	*a*	.2010	.1649	.1986	.0337	.0024	
		b	.2011	.1653	.1988	.0335	.0022	
		c	.2006	.1644	.1981	.0337	.0025	
1,000	58,000	*a*	.2002	.1645	.1984	.0339	.0018	
		b	.2015	.1654	.1987	.0333	.0028	
		c	.2007	.1645	.1980	.0335	.0027	
5,000	63,000	*a*	.2025	.1648	.1982	.0334	.0043	
		b	.2007	.1647	.1985	.0338	.0022	
		c	.2008	.1640	.1975	.0335	.0038	
								Bar annealed same manner as before at 500° F.; sixth annealing.
0	63,000	*a*	.2000	.1668	.1999	.0331	.0001	
		b	.1999	.1664	.1998	.0334	.0001	
		c	.1997	.1663	.1996	.0333	.0001	
1,000	64,000	*a*	.1989	.1654	.1988	.0334	.0001	
		b	.2006	.1658	.1992	.0334	.0014	
		c	.2006	.1653	.1987	.0334	.0019	
1,000	65,000	*a*	.2013	.1651	.1988	.0337	.0025	
		b	.2010	.1654	.1990	.0336	.0020	
		c	.2006	.1646	.1983	.0337	.0023	
1,000	66,000	*a*	.1990	.1645	.1983	.0338	.0007	
		b	.2012	.1651	.1988	.0337	.0024	
		c	.2009	.1645	.1983	.0338	.0026	
1,000	67,000	*a*	.2006	.1646	.1984	.0338	.0022	
		b	.1999	.1649	.1984	.0335	.0015	
		c	.2013	.1645	.1982	.0337	.0031	
1,000	68,000	*a*	.2012	.1645	.1984	.0339	.0028	
		b	.2014	.1649	.1988	.0339	.0026	
		c	.2008	.1643	.1980	.0337	.0028	
48,900	116,900	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 57.—*O. H. steel bar. Mark, 3.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Duplicate of test No. 56. The surface of the middle bearing was badly scored during the test.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.2002	.1661	.2000	.0339	.0002	
			b	.2002	.1663	.2000	.0337	.0002	
			c	.2001	.1663	.1999	.0336	.0002	
	1,000	1,000	*a*	.2011	.1652	.1991	.0339	.0020	
			b	.2002	.1654	.1994	.0340	.0008	
			c	.2009	.1653	.1991	.0338	.0018	
	1,000	2,000	*a*	.2018	.1644	.1984	.0340	.0034	
			b	.2002	.1648	.1989	.0341	.0013	
			c	.2014	.1647	.1988	.0331	.0026	
	1,000	3,000	*a*	.1974	.1628	.1970	.0342	.0004	
			b	.2013	.1644	.1985	.0341	.0028	
			c	.2023	.1644	.1985	.0341	.0038	
	1,000	4,000	*a*	.2022	.1631	.1974	.0343	.0048	
			b	.2023	.1643	.1984	.0341	.0039	
			c	.2019	.1638	.1981	.0343	.0038	
	1,000	5,000	*a*	.2021	.1628	.1973	.0345	.0048	
			b	.2001	.1634	.1978	.0344	.0023	
			c	.2027	.1637	.1980	.0343	.0047	
	5,000	10,000	*a*	.1966	.1607	.1953	.0346	.0013	
			b	.2041	.1630	.1974	.0344	.0067	
			c	.2030	.1627	.1972	.0345	.0058	
	0	10,000	*a*	.2006	.1671	.2005	.0334	.0001	Bar rested 38 days.
			b	.2006	.1668	.2002	.0334	.0004	
			c	.1997	.1655	.1992	.0337	.0005	
	1,000	11,000	*a*	.2036	.1636	.1979	.0341	.0057	
			b	.2008	.1643	.1982	.0339	.0026	
			c	.2022	.1642	.1980	.0338	.0042	

1,000	12,000	a	.2029	.1631	.1972	.0341	.0037	Bar heated in oil bath to 500° F., and kept at that temperature 1 hour; cooled slowly in oil bath; first annealing.
		b	.2030	.1641	.1982	.0339	.0048	
		c	.2023	.1637	.1977	.0340	.0046	
1,000	13,000	a	.1977	.1630	.1963	.0343	.0014	
		b	.2038	.1639	.1980	.0341	.0058	
		c	.2027	.1635	.1976	.0341	.0051	
0	13,000	a	.2010	.1676	.2008	.0332	.0002	
		b	.2000	.1665	.1998	.0333	.0002	
		c	.2001	.1661	.1998	.0334	.0003	
1,000	14,000	a	.2013	.1670	.2006	.0336	.0007	
		b	.2002	.1664	.1998	.0331	.0004	
		c	.2004	.1663	.1998	.0335	.0006	
1,000	15,000	a	.2005	.1664	.2000	.0316	.0005	
		b	.2001	.1659	.1995	.0336	.0006	
		c	.2008	.1659	.1995	.0336	.0013	
1,000	16,000	a	.2013	.1660	.1998	.0338	.0015	
		b	.2009	.1659	.1995	.0336	.0014	
		c	.2008	.1656	.1992	.0336	.0016	
1,000	17,000	a	.2000	.1655	.1992	.0538	.0007	
		b	.2002	.1653	.1992	.0339	.0010	
		c	.2014	.1654	.1991	.0337	.0023	
1,000	18,000	a	.2019	.1654	.1994	.0340	.0025	
		b	.2004	.1654	.1991	.0337	.0013	
		c	.2012	.1652	.1990	.0338	.0022	
5,000	23,000	a	.1985	.1640	.1980	.0340	.0005	
		b	.2004	.1646	.1985	.0339	.0013	
		c	.2024	.1645	.1966	.0341	.0038	
0	23,000	a	.2004	.1669	.2001	.0325	.0002	Bar annealed same manner as before at temperature of 500° F.; second annealing.
		b	.2001	.1667	.1999	.0332	.0002	
		c	.1999	.1665	.1997	.0332	.0002	
1,000	24,000	a	.2010	.1666	.2000	.0334	.0010	
		b	.2001	.1666	.1993	.0332	.0003	
		c	.2002	.1660	.1995	.0335	.0007	
1,000	25,000	a	.1994	.1658	.1993	.0337	.0001	
		b	.2004	.1662	.1995	.0333	.0009	
		c	.2007	.1658	.1992	.0334	.0005	
1,000	26,000	a	.2002	.1654	.1992	.0338	.0010	
		b	.2010	.1658	.1994	.0336	.0016	
		c	.2007	.1654	.1990	.0336	.0017	

No. 57.—*O. H. steel bar. Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	1,000	27,000	*a*	.1995	.1654	.1987	.0333	.0008	
			b	.2001	.1653	.1991	.0338	.0010	
			c	.2013	.1650	.1988	.0338	.0025	
	1,000	28,000	*a*	.2013	.1650	.1988	.0338	.0025	
			b	.2013	.1653	.1991	.0338	.0022	
			c	.2009	.1648	.1986	.0338	.0023	
	5,000	33,000	*a*	.1981	.1637	.1979	.0342	.0002	
			b	.2003	.1648	.1985	.0337	.0018	
			c	.2020	.1645	.1984	.0339	.0036	
									Bar annealed same manner as before, at temperature of 500° F.; third annealing.
	0	33,000	*a*	.2008	.1674	.2007	.0333	.0001	
			b	.1997	.1664	.1995	.0331	.0002	
			c	.2002	.1664	.2000	.0336	.0002	
	1,000	34,000	*a*	.2015	.1664	.1999	.0335	.0016	
			b	.2000	.1658	.1994	.0336	.0006	
			c	.2007	.1658	.1994	.0336	.0003	
	1,000	35,000	*a*	.2021	.1658	.1995	.0337	.0026	
			b	.2005	.1655	.1993	.0338	.0012	
			c	.2008	.1653	.1990	.0337	.0018	
	1,000	36,000	*a*	.2013	.1654	.1991	.0337	.0022	
			b	.2001	.1653	.1990	.0337	.0011	
			c	.2013	.1648	.1988	.0340	.0025	
	1,000	37,000	*a*	.2009	.1649	.1988	.0339	.0021	
			b	.2002	.1653	.1989	.0336	.0013	
			c	.2015	.1651	.1988	.0337	.0027	
	1,000	38,000	*a*	.2006	.1649	.1987	.0338	.0019	
			b	.2016	.1655	.1991	.0336	.0025	
			c	.2012	.1648	.1987	.0339	.0025	
	5,000	43,000	*a*	.2028	.1645	.1987	.0342	.0041	
			b	.2007	.1650	.1989	.0339	.0018	
			c	.2015	.1644	.1985	.0341	.0030	

0	43,000	a	.2005	.1670	.2005	.0335	0.
		b	.1999	.1664	.1998	.0334	.0001
		c	.2002	.1667	.2000	.0333	.0002
1,000	44,000	a	.2015	.1655	.1999	.0334	.0016
		b	.2002	.1662	.1995	.0333	.0007
		c	.2007	.1660	.1995	.0335	.0012
1,000	45,000	a	.2020	.1659	.1995	.0336	.0025
		b	.2008	.1658	.1993	.0335	.0015
		c	.2008	.1655	.1992	.0337	.0016
1,000	46,000	a	.1989	.1650	.1987	.0337	.0002
		b	.2013	.1654	.1992	.0338	.0021
		c	.2013	.1653	.1990	.0337	.0023
1,000	47,000	a	.1990	.1649	.1988	.0339	.0002
		b	.2004	.1653	.1990	.0337	.0014
		c	.2013	.1650	.1989	.0339	.0024
1,000	48,000	a	.2002	.1648	.1986	.0338	.0016
		b	.2003	.1650	.1988	.0332	.0015
		c	.2018	.1651	.1989	.0338	.0029
5,000	53,000	a	.1984	.1641	.1980	.0339	.0004
		b	.2018	.1651	.1989	.0338	.0029
		c	.2018	.1648	.1987	.0339	.0031

Bar annealed same manner as before, at temperature of 500 F. fourth annealing.

0	52,000	a	.2008	.1675	.2008	.0333	0.
		b	.2001	.1665	.2000	.0335	.0001
		c	.2000	.1664	.1998	.0334	.0002
1,000	54,000	a	.2018	.1664	.1999	.0335	.0019
		b	.2004	.1663	.1987	.0324	.0017
		c	.2006	.1659	.1993	.0334	.0013
1,000	55,000	a	.2020	.1661	.1996	.0335	.0024
		b	.2005	.1659	.1994	.0335	.0011
		c	.2009	.1654	.1990	.0336	.0019
1,000	56,000	a	.2021	.1655	.1992	.0337	.0029
		b	.2013	.1657	.1994	.0337	.0019
		c	.2010	.1653	.1989	.0336	.0021
1,000	57,000	a	.1988	.1647	.1985	.0338	.0003
		b	.2015	.1657	.1991	.0334	.0024
		c	.2016	.1652	.1989	.0337	.0027

Bar annealed same manner as before, at temperature of 500° F.; fifth annealing.

No. 57.—*O. H. steel bar. Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	1,000	58,000	*a*	.1988	.1618	.1987	.0339	.0001	
			b	.2005	.1652	.1990	.0338	.0015	
			c	.2018	.1651	.1989	.0338	.0029	
	5,000	63,000	*a*	.2009	.1647	.1985	.0338	.0024	
			b	.2019	.1653	.1991	.0338	.0028	
			c	.2013	.1648	.1985	.0337	.0028	
									Bar annealed same manner as before, at temperature of 500° F.; sixth annealing.
	0	63,000	*a*	.2005	.1671	.2004	.0333	.0001	
			b	.2004	.1665	.2001	.0336	.0003	
			c	.2003	.1668	.2002	.0334	.0001	
	1,000	64,000	*a*	.1995	.1655	.1994	.0339	.0001	
			b	.2009	.1662	.1996	.0334	.0013	
			c	.2010	.1656	.1994	.0338	.0016	
	1,000	65,000	*a*	.2012	.1655	.1992	.0337	.0020	
			b	.2004	.1655	.1993	.0338	.0011	
			c	.2013	.1654	.1991	.0337	.0022	
	1,000	66,000	*a*	.2007	.1649	.1990	.0341	.0017	
			b	.2003	.1651	.1991	.0340	.0012	
			c	.2016	.1652	.1990	.0338	.0026	
	1,000	67,000	*a*	.1994	.1647	.1987	.0340	.0007	
			b	.2002	.1650	.1690	.0340	.0012	
			c	.2019	.1650	.1690	.0340	.0029	
	1,000	68,000	*a*	.2014	.1647	.1989	.0342	.0025	
			b	.2017	.1651	.1992	.0341	.0025	
			c	.2013	.1647	.1986	.0339	.0027	
	63,000	131,000	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 58.—*O. H. steel from rod No. 3.*

Annealed six times at intervals of 5,000 rotations, the final annealing being done upon the completion of 33,000 rotations.

Observations on deflections and sets were made up to 38,000 rotations, after which the run was continuous until the shaft ruptured.

No. 58.—*O. H. steel bar Mark*, 3.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 0″.33. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.2008	.1675	.2006	.0331	.0002	
			b	.2010	.1675	.2008	.0333	.0002	
			c	.2009	.1674	.2006	.0332	.0003	
	1,000	1,000	*a*	.2012	.1668	.2002	.0334	.0010	
			b	.2016	.1667	.2001	.0334	.0015	
			c	.2013	.1668	.2001	.0333	.0012	
	1,000	2,000	*a*	.2022	.1664	.1999	.0335	.0023	
			b	.2010	.1660	.1995	.0335	.0015	
			c	.2019	.1662	.1998	.0336	.0021	
	1,000	3,000	*a*	.2028	.1661	.1996	.0335	.0032	
			b	.2011	.1662	.1990	.0338	.0021	
			c	.2021	.1659	.1994	.0335	.0027	
	1,000	4,000	*a*	.2012	.1150	.1985	.0338	.0024	
			b	.2008	.1642	.1980	.0338	.0028	
			c	.2034	.1654	.1991	.0337	.0043	
	1,000	5,000	*a*	.2024	.1650	.1988	.0338	.0036	
			b	.2009	.1640	.1979	.0339	.0030	
			c	.2034	.1653	.1989	.0396	.0045	
	0	5,000	*a*	.2018	.1684	.2015	.0331	.0008	Bar rested 39 days.
			b	.2009	.1674	.2004	.0330	.0005	
			c	.2008	.1671	.2003	.0332	.0005	
	1,000	6,000	*a*	.2027	.1658	.1992	.0334	.0035	
			b	.2033	.1654	.1989	.0335	.0044	
			c	.2023	.1658	.1992	.0334	.0031	
	1,000	7,000	*a*	.2003	.1649	.1985	.0336	.0018	
			b	.2009	.1643	.1980	.0337	.0029	
			c	.2038	.1658	.1991	.0333	.0047	

1,000	8,000	a	.2046	.1657	.1992	.0335	.0054	
		b	.2022	.1647	.1984	.0337	.0038	
		c	.2029	.1653	.1988	.0335	.0041	
								Bar heated in oil bath to 500° F., and kept at that temperature 1 hour; cooled slowly in oil bath.; first annealing.
0	8,000	a	.2012	.1680	.2011	.0331	.0001	
		b	.2012	.1680	.2010	.0330	.0002	
		c	.2010	.1679	.2008	.0329	.0002	
1,000	9,000	a	.2015	.1678	.2009	.0331	.0006	
		b	.2013	.1676	.2008	.0332	.0005	
		c	.2011	.1675	.2005	.0330	.0006	
1,000	10,000	a	.2016	.1673	.2006	.0333	.0010	
		b	.2020	.1671	.2004	.0333	.0016	
		c	.2013	.1669	.2003	.0334	.0010	
1,000	11,000	a	.2027	.1672	.2005	.0333	.0022	
		b	.2017	.1666	.2000	.0334	.0017	
		c	.2016	.1670	.2001	.0331	.0015	
1,000	12,000	a	.1996	.1661	.1995	.0334	.0001	
		b	.2027	.1664	.1997	.0333	.0030	
		c	.2020	.1665	.1999	.0334	.0021	
1,000	13,000	a	.2019	.1662	.1998	.0336	.0021	
		b	.2030	.1660	.1995	.0335	.0035	
		c	.2018	.1665	.1998	.0333	.0020	
								Bar annealed same manner as before, at temperature of 500° F.; second annealing.
0	13,000	a	.2018	.1687	.2018	.0331	0.	
		b	.2004	.1673	.2002	.0329	.0002	
		c	.2005	.1676	.2004	.0328	.0001	
1,000	14,000	a	.2020	.1679	.2011	.0332	.0009	
		b	.2008	.1668	.1999	.0331	.0009	
		c	.2009	.1672	.2003	.0331	.0006	
1,000	15,000	a	.2013	.1670	.2004	.0334	.0009	
		b	.2009	.1662	.1996	.0334	.0013	
		c	.2016	.1668	.2000	.0332	.0016	
1,000	16,000	a	.2016	.1667	.2000	.0333	.0016	
		b	.2022	.1662	.1997	.0335	.0025	
		c	.2014	.1668	.1998	.0332	.0016	
1,000	17,000	a	.2002	.1663	.1998	.0335	.0004	
		b	.2012	.1662	.1994	.0332	.0018	
		c	.2021	.1665	.1998	.0333	.0023	

No. 58.—*O. H. steel bar. Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	1,000	18,000	*a*	.2027	.1664	.1999	.0335	.0028	
			b	.2019	.1660	.1994	.0334	.0025	
			c	.2017	.1663	.1996	.0333	.0021	
									Bar annealed same manner as before, at temperature of 500° F.; third annealing.
	0	18,000	*a*	.2014	.1681	.2013	.0332	.0001	
			b	.2005	.1673	.2004	.0331	.0001	
			c	.2010	.1678	.2008	.0330	.0002	
	1,000	19,000	*a*	.2021	.1675	.2007	.0332	.0014	
			b	.2012	.1666	.2000	.0334	.0012	
			c	.2012	.1671	.2003	.0332	.0009	
	1,000	20,000	*a*	.2018	.1669	.2002	.0333	.0016	
			b	.2020	.1664	.1998	.0334	.0022	
			c	.2013	.1667	.2000	.0333	.0013	
	1,000	21,000	*a*	.2028	.1669	.2004	.0335	.0024	
			b	.2014	.1682	.1996	.0334	.0018	
			c	.2016	.1665	.1998	.0333	.0018	
	1,000	22,000	*a*	.1998	.1661	.1995	.0334	.0003	
			b	.1927	.1660	.1994	.0334	.0033	
			c	.2019	.1665	.1998	.0333	.0021	
	1,000	23,000	*a*	.1995	.1655	.1992	.0337	.0003	
			b	.2028	.1659	.1994	.0335	.0034	
			c	.2019	.1662	.1997	.0335	.0022	
									Bar annealed same manner as before, at temperature of 500° F.; fourth annealing.
	0	23,000	*a*	.2014	.1682	.2012	.0330	.0002	
			b	.2010	.1680	.2008	.0328	.0002	
			c	.2008	.1678	.2007	.0329	.0001	
	1,000	24,000	*a*	.2005	.1671	.2004	.0333	.0001	
			b	.2011	.1667	.1999	.0332	.0012	
			c	.2016	.1670	.2002	.0332	.0014	
	1,000	25,000	*a*	.2019	.1668	.2002	.0334	.0017	
			b	.2022	.1665	.1998	.0333	.0024	
			c	.2014	.1666	.1999	.0331	.0015	

									Bar annealed same manner as before, at temperature of 500° F.; fifth annealing.
1,000	26,000	a	.2021	.1667	.2001	.0334	.0020		
		b	.2011	.1659	.1994	.0335	.0017		
		c	.2020	.1667	.1999	.0332	.0021		
1,000	27,000	a	.2007	.1664	.1997	.0333	.0010		
		b	.2028	.1662	.1996	.0334	.0032		
		c	.2016	.1665	.1997	.0332	.0019		
1,000	28,000	a	.1998	.1658	.1994	.0336	.0004		
		b	.2031	.1661	.1995	.0334	.0036		
		c	.2016	.1663	.1998	.0335	.0018		
0	28,000	a	.2014	.1684	.2014	.0330	0.		
		b	.2011	.1680	.2011	.0331	0.		
		c	.2006	.1676	.2004	.0328	.0002		
1,000	29,000	a	.2007	.1674	.2003	.0329	.0004		
		b	.2022	.1669	.2000	.0331	.0022		
		c	.2011	.1670	.2000	.0330	.0011		
1,000	30,000	a	.2021	.1673	.2002	.0329	.0019		
		b	.2012	.1662	.1996	.0334	.0016		
		c	.2017	.1665	.1999	.0334	.0018		
1,000	31,000	a	.2022	.1669	.2000	.0331	.0022		
		b	.2013	.1661	.1994	.0333	.0019		
		c	.2021	.1666	.1999	.0333	.0022		
1,000	32,000	a	.2030	.1669	.2002	.0333	.0028		
		b	.2021	.1662	.1996	.0334	.0025		
		c	.2017	.1664	.1997	.0333	.0020		
1,000	33,000	a	.2029	.1667	.2001	.0334	.0028		
		b	.2014	.1668	.1994	.0336	.0020		
		c	.2018	.1666	.1998	.0332	.0020		
									Bar annealed same manner as before, at temperature of 500° F.; sixth annealing.
0	33,000	a	.2013	.1681	.2013	.0332	0.		
		b	.2013	.1679	.2011	.0332	.0002		
		c	.2008	.1676	.2006	.0330	.0002		
1,000	34,000	a	.2006	.1668	.2002	.0334	.0004		
		b	.2025	.1665	.2000	.0335	.0025		
		c	.2015	.1668	.2001	.0333	.0014		
1,000	35,000	a	.2000	.1662	.1997	.0335	.0003		
		b	.2027	.1662	.1998	.0336	.0029		
		c	.2018	.1665	.1999	.0334	.0019		

No. 58.—*O. H. steel bar. Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	1,000	36,000	*a*	.2031	.1666	.2003	.0337	.0028	
			b	.2020	.1661	.1996	.0335	.0024	
			c	.2017	.1663	.1998	.0335	.0019	
	1,000	37,000	*a*	.2010	.1661	.1998	.0337	.0012	
			b	.2012	.1657	.1993	.0336	.0019	
			c	.2025	.1652	.1998	.0336	.0027	
	1,000	38,000	*a*	.1992	.1652	.1990	.0338	.0002	
			b	.2028	.1654	.1992	.0338	.0036	
			c	.2024	.1660	.1997	.0337	.0027	
	56,700	94,700	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 59.—*O. H. steel bar. Mark*, 3.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Duplicate of test No. 58.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.2006	.1679	.2005	.0326	.0001	
			b	.2005	.1669	.2003	.0334	.0002	
			c	.2009	.1671	.2007	.0336	.0002	
	1,000	1,000	*a*	.2015	.1664	.2000	.0336	.0015	
			b	.2004	.1656	.1995	.0339	.0009	
			c	.2017	.1665	.2002	.0337	.0015	
	1,000	2,000	*a*	.2016	.1655	.1993	.0338	.0023	
			b	.2020	.1652	.1991	.0339	.0029	
			c	.2022	.1658	.1996	.0338	.0026	
	1,000	3,000	*a*	.1989	.1643	.1984	.0341	.0005	
			b	.2030	.1646	.1987	.0341	.0043	
			c	.2027	.1653	.1994	.0341	.0033	
	1,000	4,000	*a*	.2001	.1643	.1983	.0340	.0018	
			b	.2034	.1644	.1985	.0341	.0049	
			c	.2026	.1651	.1991	.0340	.0035	
	1,000	5,000	*a*	.1998	.1639	.1980	.0341	.0018	
			b	.2036	.1640	.1983	.0343	.0053	
			c	.2030	.1647	.1988	.0341	.0042	
	0	5,000	*a*	.2010	.1676	.2008	.0332	.0002	Bar rested 39 days.
			b	.2011	.1672	.2004	.0331	.0007	
			c	.2007	.1668	.2001	.0333	.0006	
	1,000	6,000	*a*	.2002	.1648	.1985	.0337	.0017	
			b	.2035	.1651	.1987	.0336	.0048	
			c	.2028	.1652	.1991	.0339	.0037	
	1,000	7,000	*a*	.2035	.1649	.1988	.0339	.0047	
			b	.2010	.1645	.1983	.0338	.0027	
			c	.2030	.1653	.1990	.0337	.0040	

1,000	15,000	a	.2004	.1669	.2003	.0334	.0001		
		b	.2004	.1664	.1999	.0335	.0007		
		c	.2012	.1662	.1997	.0335	.0015		
1,000	16,000	a	.2018	.1668	.2003	.0335	.0015		
		b	.2009	.1662	.1999	.0337	.0010		
		c	.2012	.1663	.1996	.0333	.0016		
1,000	17,000	a	.2010	.1664	.1999	.0335	.0011		
		b	.2005	.1659	.1994	.0335	.0011		
		c	.2017	.1658	.1996	.0338	.0021		
1,000	18,000	a	.1996	.1658	.1995	.0337	.0001		
		b	.2015	.1659	.1994	.0335	.0021		
		c	.2017	.1661	.1994	.0333	.0028		
						Bar annealed same manner as before at temperature of 500° F.; third annealing.			
0	18,000	a	.2015	.1682	.2014	.0373	.0001		
		b	.2010	.1676	.2007	.0331	.0003		
		c	.1997	.1662	.1995	.0333	.0002		
1,000	19,000	a	.2014	.1675	.2008	.0333	.0006		
		b	.2007	.1667	.2001	.0334	.0006		
		c	.2006	.1663	.1995	.0332	.0013		
1,000	20,000	a	.2019	.1671	.2005	.0334	.0014		
		b	.2008	.1664	.1999	.0345	.0009		
		c	.2011	.1659	.1996	.0337	.0015		
1,000	21,000	a	.2019	.1668	.2003	.0335	.0016		
		b	.2018	.1664	.1998	.0334	.0014		
		c	.2012	.1661	.1995	.0334	.0017		
1,000	22,000	a	.2015	.1663	.1999	.0336	.0016		
		b	.2020	.1662	.1997	.0335	.0023		
		c	.2014	.1656	.1994	.0338	.0020		
1,000	23,000	a	.2008	.1662	.1997	.0335	.0011		
		b	.2005	.1657	.1993	.0336	.0012		
		c	.2021	.1659	.1994	.0335	.0027		
						Bar annealed same manner as before at temperature of 500° F.; fourth annealing.			
0	23,000	a	.2009	.1677	.2009	.0332	.0001		
		b	.2006	.1673	.2005	.0332	.0003		
		c	.2008	.1675	.2005	.0330	.0003		
1,000	24,000	a	.2016	.1674	.2006	.0332	.0010		
		b	.2009	.1666	.2001	.0335	.0008		
		c	.2012	.1666	.2001	.0336	.0011		

No. 59.—*O. H. steel bar. Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	1,000	25,000	*a*	.2019	.1670	.2005	.0335	.0014	
			b	.2010	.1663	.1999	.0336	.0011	
			c	.2013	.1665	.1998	.0333	.0015	
	1,000	26,000	*a*	.2016	.1666	.2000	.0334	.0016	
			b	.2018	.1661	.1998	.0337	.0020	
			c	.2014	.1664	.1997	.0333	.0017	
	1,000	27,000	*a*	.2018	.1663	.1999	.0336	.0014	
			b	.2021	.1659	.1998	.0339	.0023	
			c	.2016	.1660	.1996	.0336	.0020	
	1,000	28,000	*a*	.2022	.1665	.2001	.0336	.0021	
			b	.2015	.1662	.1998	.0336	.0017	
			c	.2016	.1660	.1995	.0335	.0021	
									Bar annealed same manner as before at temperature of 500° F.; fifth annealing.
	0	28,000	*a*	.2014	.1679	.2012	.0333	.0002	
			b	.2007	.1676	.2006	.0330	.0001	
			c	.2006	.1670	.2004	.0334	.0002	
	1,000	29,000	*a*	.2005	.1670	.2004	.0334	.0001	
			b	.2011	.1665	.2000	.0335	.0011	
			c	.2014	.1667	.2000	.0333	.0014	
	1,000	30,000	*a*	.2021	.1670	.2005	.0335	.0016	
			b	.2010	.1664	.1999	.0335	.0011	
			c	.2014	.1664	.1998	.0334	.0016	
	1,000	31,000	*a*	.2022	.1668	.2003	.0335	.0019	
			b	.2012	.1662	.1999	.0337	.0013	
			c	.2016	.1663	.1997	.0334	.0019	
	1,000	32,000	*a*	.2021	.1666	.2001	.0335	.0020	
			b	.2017	.1661	.1998	.0337	.0019	
			c	.2015	.1660	.1996	.0336	.0019	
	1,000	33,000	*a*	.2018	.1662	.1999	.0337	.0019	
			b	.2022	.1661	.1997	.0336	.0025	
			c	.2016	.1659	.1996	.0337	.0020	
									Bar annealed same manner as before at temperature of 500° F.; sixth annealing.

0								0.	
	32,000	a	.2010	.1677	.2010	.0333	0.		
		b	.2006	.1673	.2006	.0334	0.		
		c	.2009	.1673	.2007	.0335	.0002		
	1,000								
	34,000	a	.2004	.1666	.2002	.0336	.0002		
		b	.2016	.1664	.2000	.0336	.0016		
		c	.2015	.1664	.2001	.0337	.0014		
	1,000								
	35,000	a	.2003	.1664	.2001	.0337	.0002		
		b	.2009	.1660	.1997	.0337	.0013		
		c	.2019	.1660	.2000	.0340	.0019		
	1,000								
	36,000	a	.2015	.1664	.2002	.0338	.0013		
		b	.2007	.1657	.1996	.0339	.0011		
		c	.2020	.1660	.1999	.0339	.0021		
	1,000								
	37,000	a	.2011	.1661	.2000	.0339	.0011		
		b	.2008	.1657	.1995	.0338	.0013		
		c	.2022	.1658	.1997	.0339	.0025		
	1,000								
	38,000	a	.1996	.1656	.1995	.0339	.0001		
		b	.2018	.1657	.1996	.0339	.0022		
		c	.2022	.1658	.1998	.0340	.0024		
	1,000								
	41,850								Bar ruptured.
	79,850								

TEST NO. 70.—*O. H. steel from rod No. 4.*

Shafts from rod No. 4 were all run under the same maximum fiber stress, 45,000 pounds per square inch.

A moderate heating of the shaft accompanies stresses which cause decided permanent sets, the metal in the vicinity of the middle bearing attaining temperatures from 100° F. upward, according to the magnitude of the sets and the speed of rotation.

When no mention is made of the temperature the heating was moderate, perceptible to the touch, and ranging from atmospheric temperature to about 120° F.

This shaft acquired a moderate temperature while running, perceptible to the touch.

Micrometer observations were made up to the time of reaching 10,000 rotations, after which the testing was continuous until the shaft was ruptured.

No. 70.—*O. H. steel bar. Mark, 4.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.1998	.1649	.1995	.0346	.0003	
			b	.1999	.1651	.1996	.0345	.0003	
			c	.1999	.1651	.1996	.0345	.0003	
	1,000	1,000	*a*	.2015	.1615	.1962	.0347	.0053	
			b	.2029	.1629	.1978	.0349	.0051	
			c	.2017	.1629	.1977	.0348	.0040	
	1,000	2,000	*a*	.1993	.1601	.1950	.0349	.0043	
			b	.2048	.1617	.1968	.0351	.0080	
			c	.2023	.1615	.1965	.0350	.0058	
	1,000	3,000	*a*	.2045	.1603	.1954	.0351	.0091	
			b	.2001	.1604	.1957	.0353	.0044	
			c	.2039	.1613	.1963	.0350	.0076	
	2,000	5,000	*a*	.1929	.1568	.1919	.0351	.0010	
			b	.2044	.1601	.1954	.0353	.0090	
			c	.2055	.1611	.1962	.0371	.0093	
	5,000	10,000	*a*	.1947	.1566	.1925	.0359	.0022	
			b	.2073	.1599	.1955	.0356	.0118	
			c	.2046	.1603	.1956	.0353	.0090	
	42,900	52,900		.....	.....	.....	.....	.....	Bar ruptured.

No. 71.—*O. H. steel bar. Mark, 4.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

This shaft was kept cool by means of a stream of water at about 65° F., played on the metal at the middle bearing during the test.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.1998	.1651	.1994	.0343	.0004	
			b	.1998	.1651	.1995	.0344	.0003	
			c	.1999	.1650	.1994	.0344	.0005	
									Stream of cold water played on bar continually during the test.
	1,000	1,000	*a*	.2000	.1621	.1969	.0348	.0031	
			b	.2025	.1631	.1979	.0348	.0046	
			c	.2018	.1619	.1964	.0345	.0054	
	1,000	2,000	*a*	.1966	.1594	.1945	.0351	.0021	
			b	.1997	.1609	.1961	.0352	.0036	
			c	.2051	.1608	.1958	.0350	.0093	
	1,000	3,000	*a*	.2039	.1608	.1958	.0350	.0081	
			b	.2039	.1616	.1966	.0350	.0073	
			c	.2025	.1604	.1953	.0349	.0072	
	67,750	70,750		.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 72.—*O. H. steel from rod No. 4.*

No micrometer observations made.

The shaft was initially heated to the temperature of 120° F., approximately.

The temperature increased during the continuance of the test, and at the time of rupture had reached about 180° F.

The shaft ruptured at 50,000 rotations, under the maximum fiber stress of 45,000 pounds per square inch.

No. 73.—*O. H. steel bar. Mark, 4.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Duplicate of test No. 71.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.2004	.1654	.2000	.0346	.0004	
			b	.2003	.1654	.1999	.0345	.0004	
			c	.2006	.1657	.2002	.0345	.0004	
									Stream of cold water played on bar continually during the test.
	1,000	1,000	*a*	.1986	.1633	.1984	.0351	.0002	
			b	.2005	.1638	.1987	.0349	.0018	
				.2024	.1635	.1984	.0349	.0040	
	1,000	2,000	*a*	.2025	.1633	.1985	.0352	.0040	
			b	.2021	.1636	.1985	.0349	.0036	
			c	.2022	.1628	.1977	.0349	.0045	
	1,000	3,000	*a*	.1999	.1628	.1980	.0352	.0019	
			b	.2031	.1633	.1984	.0351	.0047	
			c	.2024	.1625	.1975	.0350	.0049	
	55,100	58,100	.....	.....	.....	.....	.....	.....	Bar ruptured.

Tests Nos. 103 to 106, inclusive, were shafts from O. H. steel rod No. 4*a*.

They were run at a speed of 2,200 rotations per minute, all working under the same fiber stress, 45,000 pounds per square inch.

Test No. 103 was begun with the shaft cold, but allowed to increase in temperature, due to the sets which the metal received and the high rate of speed at which it was driven.

Judging from the color of the cylindrical surface at the middle bearing after the test, which was a purple, the temperature rose to about 500° F.

Rupture occurred at 46,200 rotations.

Nos. 104 and 105 were tested cold, a stream of water being played on them at the middle bearing during the tests.

They ruptured at 58,000 and 54,000 rotations respectively.

No. 106 was initially heated by means of a gas-burner until it was blue, the estimated temperature being 600° F.

The gas was turned off when the test began, the temperature after this being maintained by reason of the rapid rotations under loads which caused sets.

Rupture occurred at 57,000 rotations.

TEST NO. 74.—*O. H. steel from rod No. 5.*

Under 45,000 pounds per square inch, maximum fiber stress, 2,000 rotations were made, then the load was increased to 48,000 pounds per square inch, and maintained for the remainder of the test.

The other shafts from rod No. 5, were run under the latter stress.

A stream of cold water flowed continually over the middle bearing of this shaft during the test, keeping the temperature at about 65° F.

No. 74.—*O. H. steel bar. Mark, 5.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflection.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.1999	.1665	.1997	.0332	.0002	
			b	.1997	.1661	.1995	.0334	.0002	
			c	.2000	.1662	.1996	.0334	.0004	
	1,000	1,000	*a*	.1994	.1656	.1993	.0337	.0001	Stream of cold water played on bar continually during the test.
			b	.1998	.1660	.1994	.0334	.0004	
			c	.2004	.1659	.1994	.0335	.0010	
	1,000	2,000	*a*	.2008	.1656	.1991	.0335	.0017	
			b	.2003	.1656	.1992	.0336	.0011	
			c	.2004	.1654	.1991	.0337	.0013	
48,000	0	2,000	*a*	.2005	.1629	.1990	.0361	.0015	
			b	.2002	.1631	.1991	.0360	.0011	
			c	.2005	.1631	.1990	.0359	.0015	
	1,000	3,000	*a*	.1984	.1610	.1972	.0362	.0012	
			b	.2018	.1620	.1982	.0362	.0036	
			c	.2015	.1620	.1983	.0363	.0032	
	1,000	4,000	*a*	.2019	.1607	.1970	.0363	.0049	
			b	.2025	.1612	.1977	.0365	.0048	
			c	.2017	.1613	.1976	.0363	.0041	
	1,000	5,000	*a*	.2012	.1603	.1965	.0362	.0047	
			b	.1992	.1595	.1961	.0366	.0031	
			c	.2035	.1608	.1973	.0365	.0062	
	47,800	52,800		.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 75.—*O. H. steel from rod No. 5.*

The shaft was initially heated by means of a gas-burner to about 150° F., then measured while hot, after which the temperature was increased to about 180° F. and kept there during the test.

No. 75.—*O. H. steel bar. Mark*, 5.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48,000	0	0	*a*	.2002	.1641	.2000	.0359	.0002	
			b	.2005	.1645	.2001	.0356	.0004	
			c	.2005	.1645	.2002	.0357	.0003	
									Bar heated to about 150° F. by means of gas-burners.
	0	0	*a*	.1997	.1628	.1997	.0369	0.	Measurements while hot.
			b	.2003	.1638	.2001	.0363	.0002	
			c	.2004	.1640	.2001	.0361	.0003	
									Temperature of bar brought up to about 180° F. and maintained through the test.
	1,000	1,000	*a*	.1959	.1586	.1960	.0374	—.0001	
			b	.2053	.1642	.2008	.0366	.0015	
			c	.2009	.1623	.1989	.0366	.0020	
	1,000	2,000	*a*	.2074	.1641	.2019	.0378	.0055	
			b	.1947	.1559	.1928	.0369	.0019	
			c	.2032	.1630	.1996	.0366	.0036	
	1,000	3,000	*a*	.1878	.1504	.1882	.0378	—.0004	
			b	.2029	.1623	.1994	.0371	.0035	
			c	.2089	.1674	.2040	.0366	.0049	
	29,850	32,850	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 76.—*O. H. steel bar. Mark, 5.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Duplicate of test No. 75, except the shaft was initially heated to about 200° F.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
42,000	0	0	*a*	.2001	.1646	.1999	.0353	.0002	
			b	.2000	.1641	.1999	.0358	.0001	
			c	.2002	.1642	.1999	.0357	.0003	
	0	0	*a*	.1991	.1609	.1990	.0381	.0001	Bar heated to about 200° F. by means of gas burners.
			b	.1994	.1618	.1993	.0375	.0001	Measurements while hot, for these and subsequent readings.
			c	.1996	.1638	.1995	.0372	.0001	
	1,000	1,000	*a*	.2045	.1618	.1991	.0373	.0054	
			b	.2013	.1620	.1991	.0371	.0022	
			c	.1994	.1589	.1968	.0369	.0026	
	1,000	2,000	*a*	.1894	.1522	.1896	.0374	—.0002	
			b	.2018	.1612	.1983	.0371	.0035	
			c	.2079	.1661	.2027	.0366	.0052	
	1,000	3,000	*a*	.2068	.1638	.2014	.0376	.0054	
			b	.1910	.1519	.1892	.0373	.0018	
			c	.2064	.1652	.2019	.0367	.0045	
	28,650	31,650	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 77.—*O. H. steel bar. Mark, 5.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Duplicate of test No. 74.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
48,000	0	0	*a*	.1994	.1641	.1992	.0351	.0002	
			b	.1994	.1638	.1990	.0357	.0004	
			c	.1995	.1634	.1992	.0358	.0003	
	1,000	1,000	*a*	.1995	.1622	.1985	.0362	.0010	Stream of cold water played on bar continually during the test.
			b	.2001	.1626	.1986	.0360	.0015	
			c	.1988	.1625	.1987	.0362	.0001	
	1,000	2,000	*a*	.1998	.1618	.1980	.0362	.0018	
			b	.1993	.1617	.1978	.0361	.0015	
			c	.2005	.1621	.1984	.0363	.0021	
	1,000	3,000	*a*	.2015	.1617	.1982	.0365	.0033	
			b	.2001	.1615	.1978	.0363	.0023	
			c	.2003	.1617	.1980	.0367	.0023	
	52,900	55,900	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 83.—*O. H. steel from rod No. 6.*

This and following tests of shafts from rod No. 6 made under the maximum fiber stress of 45,000 pounds per square inch.

The test was begun with the shaft cold; it gradually acquired a higher temperature, and reached about 150° F. at the close of the test.

No. 83.—*O. H. steel bar. Mark, 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	0	0	*a*	.1990	.1658	.1990	.0332	0.	
			b	.1994	.1661	.1992	.0331	.0002	
			c	.1991	.1657	.1988	.0331	.0003	
	1,000	1,000	*a*	.2004	.1653	.1985	.0332	.0019	
			b	.1994	.1653	.1982	.0329	.0012	
			c	.1997	.1655	.1986	.0331	.0011	
	1,000	2,000	*a*	.1975	.1639	.1973	.0334	.0002	
			b	.2008	.1645	.1976	.0331	.0027	
			c	.2004	.1648	.1963	.0335	.0021	
	1,000	3,000	*a*	.2017	.1641	.1976	.0335	.0041	
			b	.1994	.1640	.1971	.0331	.0023	
			c	.2006	.1643	.1978	.0335	.0028	
	2,000	5,000	*a*	.1989	.1622	.1960	.0337	.0029	
			b	.1986	.1622	.1958	.0335	.0028	
			c	.2024	.1633	.1971	.0338	.0053	
	55,550	60,550	.....	.....	.....	.....	.....	.....	Bar ruptured. Temperature of bar about 150° F. at close of test.

TEST NO. 84.—*O. H. steel from rod No. 6.*

The shaft was initially heated by means of a gas burner, which was lighted 1 hour and 25 minutes before the shaft was run.

The temperature of the shaft at the commencement of the test was about 300° F., and had risen to 337° F., when 10,000 rotations were made.

The temperature continued to rise as the test progressed, the gas burner being kept lighted, and reached 385° at 29,900 rotations.

The shaft was then cooled and rested 16 hours without load, after which it was again heated to 356° F., and the test resumed.

At 70,000 rotations the temperature was 410° F.

The shaft ruptured at 87,550 rotations, the temperature then being 432° F.

TEST NO. 85.—*O. H. steel from rod No. 6.*

Tested hot.

Gas was lighted 1 hour and 25 minutes before rotations began, the thermometer indicating 344° F. at the commencement of the test.

At 20,000 rotations the temperature had increased to 386° F., which continued to rise, at 40,000 rotations the thermometer indicating 382° F., and at 60,000, 395° F.

Rupture occurred at 61,800 rotations.

TEST NO. 86.—*O. H. steel from rod No. 6.*

The shaft was initially heated by means of a gas burner, which was lighted 20 minutes before the test was begun. The thermometer indicated 300° F. at the commencement of the test.

At 15,000 rotations the thermometer indicated 387°, and at 30,000 rotations, 402° F.

The gas was now turned off and the shaft cooled with water, after which the test was resumed with the shaft cold.

It was allowed to increase in temperature, but without external heating, and reached about 150° F. at the end of the test.

No. 86.—*O. H. steel bar. Mark, 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	30,000	30,000	*a*	.1895	.1558	.1894	.0336	.0001	
			b	.2105	.1694	.2016	.0332	.0089	
			c	.2053	.1589	.2005	.0416	.0048	
	1,000	31,000	*a*	.1982	.1599	.1943	.0344	.0039	
			b	.2079	.1627	.1968	.0341	.0111	
			c	.2040	.1624	.1969	.0345	.0071	
	1,000	32,000	*a*	.1926	.1575	.1922	.0347	.0004	
			b	.2043	.1608	.1953	.0345	.0090	
			c	.2069	.1627	.1972	.0345	.0097	
	1,000	33,000	*a*	.1995	.1595	.1941	.0346	.0054	
			b	.2062	.1597	.1942	.0345	.0060	
			c	.2077	.1625	.1970	.0345	.0107	
	2,000	35,000	*a*	.2048	.1606	.1953	.0347	.0095	
			b	.1994	.1591	.1939	.0348	.0055	
			c	.2068	.1622	.1970	.0348	.0098	
	23,550	58,550	.....	.....	.....	.....	.....	.....	Bar ruptured. Temperature about 150° F.

TEST NO. 87.—*O. H. steel from rod No. 7.*

This and the following shafts from rod No. 7 were loaded with 45,000 pounds per square inch maximum fiber stress.

It was initially heated by means of a gas burner to 300° F. at the commencement of the test.

After 15,000 rotations the thermometer indicated 412° F., which increased to 468° at 30,000 rotations.

The gas was turned off and the shaft cooled with water.

The test was resumed, allowing the shaft to increase in temperature, but without external heating. It acquired the temperature of about 150° F. at the end of the test.

No. 87.—*O. H. steel bar. Mark, 7.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
45,000	30,000	30,000	*a*	.1964	.1619	.1960	.0341	.0004	
			b	.2003	.1656	.1990	.0334	.0013	
			c	.2037	.1674	.2010	.0336	.0027	
	1,000	31,000	*a*	.2009	.1632	.1973	.0340	.0036	
			b	.2005	.1648	.1987	.0339	.0018	
			c	.2021	.1656	.1995	.0339	.0026	
	1,000	32,000	*a*	.2022	.1633	.1977	.0344	.0045	
			b	.2014	.1648	.1989	.0341	.0025	
			c	.2014	.1654	.1994	.0340	.0020	
	1,000	33,000	*a*	.2015	.1630	.1973	.0343	.0042	
			b	.2021	.1649	.1989	.0340	.0032	
			c	.2015	.1655	.1993	.0338	.0022	
	2,000	35,000	*a*	.1999	.1621	.1965	.0344	.0004	
			b	.2018	.1645	.1985	.0340	.0033	
			c	.2021	.1651	.1993	.0342	.0028	
	73,250	108,250	.....	.....	.....	.....	.....	.....	Bar ruptured; temperature about 150° F.

TEST No. 88.—*O. H. steel from rod No. 7.*

The test began with the shaft initially heated to 410° F.
After 20,000 rotations the thermometer indicated 425° F.
Then followed an interval of rest, without load, of 15 hours.
The shaft was again heated by a gas burner, and the test resumed.
After 40,000 total number of rotations the thermometer indicated 406° F., which temperature was increased to 412° and 416° at 60,000 and 80,000 rotations respectively.
At the time of rupture the temperature was 410° F.
Rupture occurred at 95,400 rotations.

TEST No. 89.—*O. H. steel from rod No. 7.*

The shaft was initially heated by means of gas burners to the estimated temperature of 700° F. At this temperature the test began.
The shaft made 11,400 rotations when excessive yielding by transverse deflection set in.
There was insufficient power in the belting of the testing apparatus to drive the shaft in its present deflected condition, hence the hot test was discontinued, the shaft cooled with a stream of water, and the test afterward resumed cold.
A few turns of the apparatus were made by hand which straightened the shaft somewhat; it was then run by power, at the usual rate of speed, 400 rotations per minute. Violent wabbling occurred and continued for awhile.
After 20,000 rotations the wabbling still moderately severe, had diminished considerably over the most violent state, and continued to run in about the same manner to the close of the test, the shaft rupturing after 117,900 rotations.

TEST No. 90.—*O. H. steel from rod No. 7.*

Duplicate of test No. 89.
The shaft was heated and made 17,600 rotations at the estimated temperature of 700° F., then cooled with water and run cold for the remainder of the test.
The shaft ruptured at 140,350 rotations.

TEST No. 111.—*O. H. steel shaft from a steel bar marked* 15.

This bar was from a lot of steel used in the second series of temperature tests, and has the following chemical composition:

Elements:	Per cent.
C	.72
Mn	.76
Si	.20
S	.056
P	.086
Cu	.186
Fe by difference	97.992

The test was made for the purpose of determining whether the deflection of the shaft sensibly varied on account of difference in speed of rotation, and comparative observations were made under different fiber stresses.
The maximum speed was 2,200 turns per minute.

As described in a previous report (see Report 1888, page 782) the deflections were measured by means of a micrometer mounted on a cross bar below the shaft and very near its middle bearing.

The micrometer made contact with the under side of the shaft, and the smaller of two comparative readings indicated the greater deflection of the shaft.

This shaft was not quite straight at the commencement of the test, causing a slight wabbling motion when rotated, which interfered with accuracy of measurements within narrow limits.

In the tabulated details of the test are columns of figures showing the fiber stress, the total number of rotations made, and the micrometer readings taken at full speed of the shaft, 2,200 rotations per minute, and again when the shaft was slowly turned by hand.

Two other columns which are deduced from the micrometer readings, show the apparent difference in the deflection at these two rates of speed.

It appears from these readings that generally the shaft appeared to deflect more when slowly turned than when at full speed.

It is thought, however, that this effect is due mainly to the fact that the shaft was not quite straight.

Certainly as the fiber stress was increased the differences in deflections decreased, and we are led to conclude that a speed has not yet been reached which causes a sensible change in the deflection of a rotating shaft loaded within the elastic limit of the metal.

Table showing observations on the total deflection of shaft at different rates of speed.

Maximum fiber stress per square inch.	Number of rotations.	Micrometer readings.		Greater deflection.	
		Speed 2,200.	Slowly turned.	Speed 2,200.	Slowly turned.
Pounds.		*Inch.*	*Inch.*	*Inch.*	*Inch.*
20,000	0	.....	.5818	.....	.....
	1,400	.5810	.5806	.....	.0004
	2,600	.5810	.5818	.0008	.....
	3,700	.5825	.5810	.....	.0015
30,000	3,700	.....	.5206	.....	.....
	5,000	.5215	.5196	.....	.0019
	6,100	.5210	.5190	.....	.0020
	7,560	.5210	.5185	.....	.0025
	11,770	.5200	.5195	.....	.0005
	20,000	.5205	.5207	.0002	.....
	29,900	.5210	.5205	.....	.0005
	40,000	.5210	.5202	.....	.0008
40,000	40,000	.....	.4593	.....	.....
	45,100	.4590	.4584	.....	.0006
	50,200	.4585	.4581	.....	.0004
	55,000	.4590	.4587	.....	.0003
	60,050	.4585	.4584	.....	.0001
50,000	60,050	.....	.3960	.....	.....
	65,650	.3950	.3952	.0002	.....
	70,000	.....	.3960	.....	.....

No. 111.—*C. H. steel bar. Mark*, 15.

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	70,000	*a*	.1990	.1615	.1989	.0374	.0001	
			b	.1989	.1613	.1987	.0374	.0002	
			c	.1998	.1617	.1994	.0377	.0004	
	39,950	109,950	*a*	.1992	.1616	.1989	.0373	.0003	
			b	.1990	.1613	.1987	.0374	.0003	
			c	.1998	.1918	.1994	.0376	.0004	
	50,050	160,000	*a*	.1995	.1613	.1989	.0376	.0006	
			b	.1991	.1611	.1987	.0376	.0004	
			c	.1998	.1618	.1993	.0375	.0005	
									Test discontinued.

TEST NO. 110.—*O. H. steel shaft from a steel bar marked* 21.

This bar was from a lot of steel used in the second series of temperature tests, and had the following chemical composition:

Elements:	Per cent.
C	1.14
Mn	.10
Si	.15
S	Tr.
P	.018
Cu	0
Fe by difference	98.592

Speed of tests, 2,200 rotations per minute.

Tested for the same purpose as No. 111, page 953.

In this test the greater deflections predominated at high speed, in only two instances were the deflections greater when slowly turned, until the fiber stress was increased to 50,000 pounds per square inch, when the deflections were much the greater at slow speed. When slowly turned the shaft was rotated by hand.

The effect of high speed in diminishing the deflection of shafts loaded above their elastic limits has been referred to in previous reports.

Subsequent observations showed the fiber stress, 50,000 pounds per square inch, exceeded the elastic limit of this shaft, thus accounting for the diminished deflections observed under this load when run at high speed.

Table showing observations on the total deflection of shaft at different rates of speed.

Maximum fiber stress per square inch.	Number of rotations.	Micrometer readings.		Greater deflection.	
		Speed 2,200.	Slowly turned.	Speed 2,200.	Slowly turned.
Pounds.		*Inch.*	*Inch.*	*Inch.*	*Inch.*
0	.....	.....	.7046	.....	.....
			.7026	.....	.....
20,000	.....	.....	.5870	.....	.....
			.5835	.....	.....
20,000	2,000	.5819	.5820	.0001	.....
	4,000	.5819	.5826	.0007	.....
30,000	4,000	.....	.5233	.....	.....
	4,800	.5210	.5228	.0018	.....
	6,000	.5218	.5209	.....	.0009
	6,750	.5214	.5214	0.	.....
40,000	6,750	.....	.4627	.....	.....
	8,370	.4620	.4622	.0002	.....
	9,770	.4580	.4621	.0041	.....
	10,600	.4600	.4615	.0015	.....
	11,350	.4620	.4621	.0001	.....
	12,200	.4618	.4611	.....	.0007
50,000	12,200	.....	.4042	.....	.....
	13,200	.4020	.3990	.....	.0030
	14,100	.3980	.3960	.....	.0020
	14,900	.3960	.3911	.....	.0049
	15,850	.3900	.3832	.....	.0068

No. 110.—*O. H. steel bar. Mark*, 21.

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
50,000	0	15,850	*a*	.2036	.1594	.1972	.0378	.0064	
			b	.2006	.1588	.1969	.0381	.0037	
			c	.2013	.1586	.1966	.0380	.0047	
									Stream of cold water now played on bar.
	9,950	25,800	*a*	.2000	.1535	.1931	.0396	.0069	
			b	.2029	.1533	.1934	.0396	.0095	
			c	.2046	.1533	.1930	.0397	.0116	
	55,200	81,000	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST No. 41.—*Wrought-iron shaft from rod No.* 1.

The test was begun with the maximum fiber stress, 25,000 pounds per square inch, which was increased by 1,000 pounds per square inch increments, after successive runs of 5,000 turns each.

Slight sets were displayed under the first load, but did not increase rapidly until 29,000 pounds per square inch fiber stress was applied.

The shaft finally ruptured under 47,000 pounds per square inch fiber stress, after having made 111,500 rotations.

No. 41.—*Wrought-iron bar (Burden's). Mark*, 1.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
25,600	0	0	*a*	.2005	.1817	.2004	.0187	.0001	
			b	.2006	.1816	.2004	.0188	.0002	
			c	.2004	.1817	.2001	.0184	.0003	
	5,000	5,000	*a*	.2005	.1820	.2004	.0184	.0001	
			b	.2006	.1818	.2004	.0186	.0002	
			c	.2004	.1817	.2001	.0184	.0003	
26,000	0	5,000	*a*	.2007	.1813	.2005	.0192	.0002	
			b	.2006	.1811	.2004	.0193	.0002	
			c	.2004	.1809	.2001	.0192	.0003	
	5,000	10,000	*a*	.2005	.1812	.2004	.0192	.0001	
			b	.2008	.1810	.2003	.0193	.0005	
			c	.2005	.1808	.2001	.0196	.0004	
27,000	0	10,000	*a*	.2007	.1806	.2004	.0198	.0003	
			b	.2007	.1802	.2004	.0202	.0003	
			c	.2004	.1801	.2000	.0199	.0004	
	5,000	15,000	*a*	.2009	.1804	.2004	.0200	.0005	
			b	.2006	.1801	.2002	.0201	.0004	
			c	.2005	.1801	.2001	.0200	.0004	
28,000	0	15,000	*a*	.2006	.1795	.2003	.0208	.0003	
			b	.2008	.1793	.2000	.0207	.0008	
			c	.2005	.1796	.2001	.0205	.0004	
	5,000	20,000	*a*	.2004	.1793	.2001	.0208	.0003	
			b	.2009	.1792	.2000	.0208	.0009	
			c	.2006	.1793	.2000	.0207	.0006	
29,000	0	20,000	*a*	.2008	.1790	.2003	.0213	.0005	
			b	.2009	.1786	.2000	.0214	.0009	
			c	.2006	.1787	.2001	.0214	.0005	

No. 41.—*Wrought-iron bar (Burden's). Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	5,000	25,000	*a*	.2004	.1789	.2002	.0213	.0002	
			b	.2012	.1781	.1983	.0207	.0024	
			c	.2007	.1784	.1999	.0215	.0008	
30,000	0	25,000	*a*	.2009	.1789	.2002	.0222	.0007	
			b	.2010	.1775	.1987	.0212	.0023	
			c	.2008	.1775	.1999	.0234	.0009	
	5,000	30,000	*a*	.2012	.1783	.2002	.0219	.0010	
			b	.2003	.1770	.1993	.0223	.0010	
			c	.2009	.1778	.1998	.0230	.0011	
31,000	0	30,000	*a*	.2011	.1771	.2001	.0230	.0010	
			b	.2011	.1762	.1983	.0221	.0018	
			c	.2010	.1768	.1998	.0230	.0012	
	5,000	35,000	*a*	.2018	.1767	.1998	.0231	.0020	
			b	.2010	.1759	.1989	.0230	.0021	
			c	.2011	.1764	.1995	.0231	.0016	
32,000	0	35,000	*a*	.2013	.1760	.1998	.0238	.0015	
			b	.2014	.1747	.1986	.0239	.0028	
			c	.2013	.1755	.1995	.0240	.0018	
	5,000	40,000	*a*	.2005	.1749	.1990	.0241	.0015	
			b	.2026	.1740	.1982	.0242	.0044	
			c	.2016	.1755	.1991	.0236	.0025	
33,000	0	40,000	*a*	.2017	.1749	.1994	.0245	.0023	
			b	.2012	.1734	.1981	.0247	.0031	
			c	.2016	.1745	.1991	.0246	.0025	
	5,000	45,000	*a*	.2005	.1735	.1983	.0248	.0022	
			b	.2002	.1720	.1968	.0248	.0034	
			c	.2031	.1741	.1986	.0245	.0045	
34,000	0	45,000	*a*	.2024	.1736	.1988	.0252	.0036	
			b	.2020	.1717	.1972	.0255	.0048	
			c	.2028	.1732	.1985	.0253	.0038	

35,000	5,000	50,000	a	.1900	.1715	.1971	.0256	.0019					
			b	.2052	.1713	.1969	.0256	.0033					
			c	.2028	.1723	.1977	.0265	.0051					
	0	50,000	a	.2023	.1715	.1979	.0264	.0049					
			b	.2032	.1700	.1964	.0264	.0068					
			c	.2031	.1715	.1978	.0263	.0068					
	5,000	55,000	a	.1998	.1699	.1963	.0264	.0035					
			b	.2044	.1696	.1963	.0266	.0102					
			c	.2030	.1705	.1967	.0263	.0113					
36,000	0	55,000	a	.2039	.1726	.2001	.0268	.0038					
			b	.2025	.1714	.1981	.0267	.0044					
			c	.2009	.1708	.1971	.0268	.0068					
	5,000	60,000	a	.2039	.1685	.1958	.0278	.0081					
			b	.1988	.1668	.1924	.0276	.0054					
			c	.2005	.1693	.1964	.0271	.0101					
37,000	0	60,000	a	.2049	.1701	.1976	.0275	.0073					
			b	.2031	.1673	.1950	.0277	.0081					
			c	.2039	.1688	.1965	.0277	.0074					
	5,000	65,000	a	.2077	.1670	.1958	.0288	.0119					
			b	.1995	.1643	.1931	.0288	.0084					
			c	.2056	.1670	.1955	.0285	.0101					
38,000	0	65,000	a	.2060	.1666	.1969	.0293	.0101					
			b	.2040	.1641	.1936	.0295	.0104					
			c	.2054	.1660	.1954	.0294	.0100					
	5,000	70,000	a	.1987	.1640	.1934	.0294	.0083					
			b	.2107	.1668	.1954	.0296	.0153					
			c	.2044	.1650	.1944	.0294	.0100					
39,000	0	70,000	a	.2063	.1653	.1954	.0301	.0090					
			b	.2058	.1644	.1948	.0304	.0110					
			c	.2050	.1642	.1943	.0301	.0107					
	5,000	75,000	a	.1986	.1648	.1940	.0297	.0046					
			b	.2136	.1679	.1976	.0297	.0150					
			c	.2020	.1630	.1921	.0301	.0080					
40,000	0	75,000	a	.2045	.1650	.1956	.0306	.0089					
			b	.2078	.1656	.1964	.0309	.0114					
			c	.2038	.1624	.1934	.0310	.0102					
	5,000	80,000	a	.2159	.1718	.2020	.0302	.0139					
			b	.2066	.1638	.1944	.0306	.0062					
			c	.1999	.1615	.1923	.0308	.0076					

No. 41.—*Wrought iron bar (Burden's). Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
41,000	0	80,000	*a*	.2098	.1678	.1994	.0316	.0104	
			b	.2044	.1618	.1938	.0320	.0106	
			c	.2012	.1603	.1921	.0318	.0091	
	5,000	85,000	*a*	.2159	.1654	.1968	.0314	.0191	
			b	.2089	.1628	.1945	.0317	.0144	
			c	.2023	.1578	.1898	.0320	.0125	
42,000	0	85,000	*a*	.2091	.1621	.1950	.0329	.0141	
			b	.2084	.1602	.1932	.0330	.0152	
			c	.2042	.1567	.1898	.0331	.0144	
	5,000	90,000	*a*	.2176	.1752	.2068	.0316	.0108	
			b	.1881	.1517	.1838	.0321	.0043	
			c	.2055	.1652	.1972	.0320	.0083	
43,000	0	90,000	*a*	.2139	.1713	.2041	.0328	.0098	
			b	.1949	.1527	.1859	.0332	.0090	
			c	.2050	.1629	.1960	.0331	.0090	
	5,000	95,000	*a*	.2040	.1661	.1984	.0323	.0056	
			b	.2201	.1764	.2086	.0322	.0115	
			c	.1882	.1493	.1822	.0329	.0060	
44,000	0	95,000	*a*	.2058	.1660	.1996	.0336	.0062	
			b	.2154	.1725	.2063	.0338	.0091	
			c	.1908	.1494	.1833	.0339	.0075	
	5,000	100,000	*a*	.7230	.1809	.2188	.0329	.0092	
			b	.1838	.1474	.1809	.0335	.0029	
			c	.2027	.1631	.1963	.0332	.0064	
45,000	0	100,000	*a*	.2189	.1771	.2113	.0342	.0078	
			b	.1902	.1491	.1835	.0344	.0067	
			c	.2019	.1613	.1950	.0343	.0063	
	5,000	105,000	*a*	.1854	.1510	.1847	.0337	.0007	
			b	.2277	.1824	.2162	.0338	.0115	
			c	.1959	.1576	.1918	.0342	.0041	

44,000	0	105,000								
			a	.1890	.1510	.1860	.0350	.0036		
			b	.2213	.1791	.2140	.0349	.0073		
			c	.1969	.1573	.1922	.0349	.0047		
	5,000	110,000	a	.2299	.1800	.2154	.0354	.0145		
			b	.2030	.1621	.1976	.0355	.0054		
			c	.1844	.1421	.1780	.0359	.0064		
47,000	0	110,000	a	.2218	.1761	.2125	.0364	.0068		
			b	.2049	.1605	.1973	.0368	.0075		
			c	.1866	.1417	.1786	.0369	.0080		
	1,500	111,500							Bar ruptured.	

TEST NO. 42.—*Wrought-iron shaft from rod No. 1.*

The test was made with the fiber stress 40,000 pounds per square inch.

After completing 30,000 rotations a fine crack was discovered near the middle bearing.

The shaft was now removed from the machine and rested without load a period of 65 days, after which the test was resumed with the same load as before.

The effect of the interval of rest was shown by the smaller sets observed afterward, but this was only a temporary effect, for after 1,000 more rotations the sets were increased again.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1999	.1693	.1995	.0302	.0004	
			b	.2004	.1698	.1998	.0300	.0006	
			c	.2003	.1693	.1994	.0301	.0009	
	1,000	1,000	*a*	.2130	.1565	.1880	.0315	.0250	
			b	.1985	.1560	.1873	.0313	.0112	
			c	.2129	.1602	.1914	.0312	.0215	
	1,000	2,000	*a*	.1858	.1501	.1813	.0312	.0045	
			b	.2203	.1633	.1938	.0305	.0265	
			c	.2097	.1598	.1911	.0313	.0186	
	1,000	3,000	*a*	.1859	.1480	.1799	.0319	.0060	
			b	.2195	.1598	.1910	.0312	.0285	
			c	2118	.1584	.1900	.0316	.0218	
	1,000	4,000	*a*	.2063	.1557	.1873	.0316	.0190	
			b	.1941	.1517	.1834	.0317	.0107	
			c	.2181	.1620	.1930	.0310	.0251	
	1,000	5,000	*a*	.2190	.1566	.1889	.0323	.0301	
			b	.2123	.1590	.1906	.0316	.0217	
			c	.2069	.1564	.1881	.0317	.0188	
	5,000	10,000	*a*	.2166	.1719	.2020	.0301	.0146	
			b	.2079	.1690	.1996	.0306	.0083	
			c	.1935	.1553	.1861	.0308	.0074	
	10,000	20,000	*a*	.1848	.1542	.1846	.0304	.0002	
			b	.2125	.1763	.2063	.0300	.0072	
			c	.2044	.1695	.2000	.0305	.0044	
	10,000	30,000	*a*	.1861	.1553	.1858	.0305	.0003	
			b	.2153	.1773	.2073	.0300	.0080	
			c	.2022	.1673	.1982	.0309	.0040	
									Crack discovered; bar removed from machine before complete rupture; rested 65 days.

No. 42.—*Wrought-iron bar (Burden's). Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	30,000	*a*	.1924	.1612	.1912	.0300	.0013	
			b	.2102	.1791	.2089	.0298	.0013	
			c	.1997	.1680	.1984	.0304	.0013	
	1,000	31,000	*a*	.1925	.1601	.1911	.0310	.0014	
			b	.2091	.1702	.2011	.0309	.0080	
			c	.2030	.1660	.1970	.0310	.0060	
	1,000	32,000	*a*	.2044	.1626	.1940	.0314	.0104	
			b	.2039	.1687	.1992	.0305	.0047	
			c	.2032	.1652	.1965	.0313	.0067	
	1,000	33,000	*a*	.1983	.1611	.1928	.0317	.0055	
			b	.2083	.1684	.1989	.0305	.0094	
			c	.2034	.1642	.1958	.0316	.0076	
	8,050	41,050	.....	.....	.....	.....	.....	.....	**Bar ruptured.**

TEST NO. 43.— *Wrought-iron shaft from rod No.* 1.

The shaft was tested under the maximum fiber stress, 40,000 pounds per square inch.

At intervals of 10,000 rotations the shaft was removed from the testing machine and annealed at 323° to 325° F.

After each annealing there was a temporary reduction in the magnitude of the sets.

The shaft finally ruptured at 86,200 rotations.

No. 43.—*Wrought-iron bar (Burden's). Mark*, 1.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1990	.1687	.1986	.0299	.0004	
			b	.1996	.1693	.1991	.0298	.0005	
			c	.1994	.1692	.1989	.0297	.0005	
	1,000	1,000	*a*	.2109	.1597	.1905	.0308	.0204	
			b	.1998	.1568	.1882	.0314	.0116	
			c	.2088	.1616	.1924	.0308	.0164	
	1,000	2,000	*a*	.2137	.1573	.1884	.0311	.0253	
			b	.2106	.1588	.1899	.0311	.0207	
			c	.2065	.1584	.1895	.0311	.0170	
	1,000	3,000	*a*	.2026	.1552	.1865	.0312	.0161	
			b	.2153	.1600	.1910	.0310	.0243	
			c	.2056	.1578	.1889	.0311	.0167	
	1,000	4,000	*a*	.2025	.1570	.1882	.0312	.0143	
			b	.2152	.1611	.1919	.0308	.0233	
			c	.2038	.1573	.1883	.0310	.0155	
	1,000	5,000	*a*	.1844	.1503	.1815	.0312	.0029	
			b	.2156	.1601	.1908	.0307	.0248	
			c	.2102	.1612	.1917	.0305	.0185	
	5,000	10,000	*a*	.2157	.1789	.2037	.0298	.0120	
			b	.1971	.1625	.1930	.0305	.0041	
			c	.1975	.1618	.1921	.0303	.0054	
									Bar straightened and then annealed at temperature of 428° F.; first annealing.
40,000	0	10,000	*a*	.2018	.1722	.2015	.0293	.0003	
			b	.1987	.1685	.1983	.0298	.0004	
			c	.1975	.1677	.1973	.0296	.0002	
	1,000	11,000	*a*	.2037	.1703	.2000	.0308	.0031	
			b	.1996	.1665	.1966	.0301	.0030	
			c	.1985	.1664	.1962	.0298	.0029	

			b	.1984	.1650	.1934	.0304	.0030
			c	.1999	.1658	.1959	.0301	.0040
	1,000	13,000	*a*	.1986	.1676	.1976	.0302	.0008
			b	.2022	.1646	.1952	.0306	.0070
			c	.1999	.1651	.1952	.0301	.0047
	1,000	14,000	*a*	.1988	.1667	.1974	.0307	.0014
			b	.2031	.1643	.1950	.0307	.0081
			c	.2003	.1644	.1948	.0304	.0055
	1,000	15,000	*a*	.2038	.1665	.1974	.0309	.0064
			b	.1982	.1623	.1933	.0310	.0049
			c	.2022	.1642	.1947	.0305	.0075
	5,000	20,000	*a*	.2032	.1618	.1934	.0316	.0098
			b	.2069	.1619	.1934	.0315	.0135
			c	.2024	.1610	.1924	.0314	.0100
								Bar straightened and then annealed at temperature of 425° F.; second annealing.
40,000	0	20,000	*a*	.2000	.1700	.1998	.0298	.0002
			b	.1991	.1691	.1989	.0298	.0002
			c	.1993	.1692	.1990	.0298	.0003
	1,000	21,000	*a*	.2023	.1687	.1989	.0302	.0034
			b	.2000	.1672	.1974	.0302	.0026
			c	.1997	.1674	.1973	.0299	.0024
	1,000	22,000	*a*	.2027	.1674	.1979	.0305	.0048
			b	.2015	.1660	.1965	.0305	.0050
			c	.2001	.1661	.1964	.0303	.0037
	1,000	23,000	*a*	.1970	.1655	.1961	.0306	.0009
			b	.2032	.1650	.1957	.0307	.0075
			c	.2011	.1655	.1959	.0304	.0052
	1,000	24,000	*a*	.1960	.1643	.1952	.0309	.0008
			b	.2038	.1645	.1953	.0308	.0085
			c	.2019	.1647	.1954	.0307	.0065
	1,000	25,000	*a*	.1977	.1640	.1951	.0311	.0026
			b	.2047	.1639	.1949	.0310	.0098
			c	.2017	.1640	.1947	.0307	.0070
40,000	5,000	30,000	*a*	.2082	.1632	.1948	.0316	.0134
			b	.1983	.1598	.1913	.0315	.0070
			c	.2046	.1620	.1932	.0312	.0114
	0	30,000	*a*	.1997	.1698	.1996	.0298	.0001
			b	.1995	.1695	.1991	.0296	.0004
			c	.1990	.1689	.1987	.0298	.0003

Bar annealed at temperature of 425° F.; third annealing.

No. 43.—*Wrought-iron bar (Burden's). Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	1,000	31,000	*a*	.2008	.1677	.1980	.0303	.0028	
			b	.2011	.1669	.1972	.0303	.0039	
			c	.1999	.1676	.1976	.0300	.0023	
	2,000	33,000	*a*	.2034	.1661	.1969	.0308	.0065	
			b	.1990	.1634	.1944	.0310	.0046	
			c	.2024	.1660	.1964	.0304	.0060	
	1,000	34,000	*a*	.1957	.1636	.1945	.0309	.0012	
			b	.2046	.1639	.1949	.0310	.0097	
			c	.2023	.1649	.6955	.0306	.0068	
	1,000	35,000	*a*	.2003	.1638	.1938	.0300	.0065	
			b	.1985	.1617	.1930	.0312	.0055	
			c	.2044	.1644	.1951	.0307	.0093	
	5,000	40,000	*a*	.2070	.1630	.1945	.0315	.0135	
			b	.1984	.1596	.1918	.0317	.0071	
			c	.2053	.1629	.1938	.1809	.0115	
40,000	0	40,000	*a*	.2000	.1698	.1988	.0290	.0012	Bar annealed at temperature of 425° F.; fourth annealing.
			b	.1994	.1689	.1988	.0299	.0006	
			c	.1990	.1688	.1986	.0298	.0004	
	1,000	41,000	*a*	.2032	.1676	.1981	.0305	.0051	
			b	.2003	.1658	.1963	.0305	.0040	
			c	.2004	.1668	.1970	.0302	.0034	
	1,000	42,000	*a*	.1997	.1658	.1964	.0306	.0033	
			b	.2034	.1648	.1956	.0308	.0078	
			c	.2010	.1655	.1960	.0305	.0050	
	1,000	43,000	*a*	.2018	.1645	.1954	.0309	.0064	
			b	.2043	.1636	.1948	.0312	.0095	
			c	.2018	.1645	.1951	.0306	.0067	
	1,000	44,000	*a*	.2008	.1636	.1647	.1911	.0061	
			b	.1987	.1614	.1626	.1912	.0081	
			c	.2045	.1638	.1648	.1910	.0097	

	1,000	45,000	a	.1969	.1630	.1941	.0311	.0028	
			b	.1989	.1615	.1928	.0313	.0061	
			c	.2047	.1638	.1945	.0307	.0102	
	5,000	50,000	a	.1989	.1602	.1918	.0316	.0021	
			b	.1987	.1596	.1912	.0316	.0075	
			c	.2074	.1628	.1938	.0310	.0136	
									Bar annealed at temperature of 425° F.; fifth annealing.
40,000	0	50,000	a	.1995	.1694	.1993	.0299	.0002	
			b	.1994	.1689	.1987	.0298	.0007	
			c	.1995	.1694	.1992	.0298	.0003	
	1,000	51,000	a	.2025	.1662	.1968	.0306	.0057	
			b	.2023	.1653	.1960	.0307	.0063	
			c	.2011	.1663	.1966	.0303	.0045	
	1,000	52,000	a	.1958	.1639	.1949	.0310	.0009	
			b	.1994	.1629	.1940	.0311	.0054	
			c	.2039	.1649	.1956	.0307	.0083	
	1,000	53,000	a	.1965	.1635	.1945	.0310	.0020	
			b	.2049	.1634	.1945	.0311	.0104	
			c	.2022	.1643	.1950	.0307	.0072	
	1,000	54,000	a	.2015	.1636	.1948	.0312	.0067	
			b	.1989	.1615	.1930	.0315	.0059	
			c	.2045	.1643	.1950	.0307	.0095	
	1.000	55,000	a	.2063	.1642	.1954	.0312	.0109	
			b	.1997	.1623	.1935	.0312	.0062	
			c	.2034	.1637	.1946	.0309	.0088	
	5,000	60,000	a	.1989	.1613	.1929	.0316	.0060	
			b	.2078	.1623	.1937	.0314	.0141	
			c	.2029	.1616	.1928	.0312	.0101	
									Bar annealed at temperature of 425° F.; sixth annealing.
40,000	0	60,000	a	.2001	.1700	.1999	.0299	.0002	
			b	.1993	.1690	.1989	.0299	.0004	
			c	.1990	.1688	.1987	.0299	.0003	
	1,000	61,000	a	.2010	.1668	.1974	.0306	.0036	
			b	.2021	.1659	.1965	.0306	.0056	
			c	.2003	.1665	.1968	.0303	.0035	
	1,000	62,000	a	.1990	.1649	.1960	.0311	.0030	
			b	.1995	.1636	.1947	.0311	.0048	
			c	.2028	.1651	.1958	.0307	.0070	
	1,000	63,000	a	.2039	.1644	.1956	.0312	.0083	
			b	.1995	.1623	.1936	.0313	.0059	
			c	.2033	.1640	.1949	.0309	.0084	

No. 43.—*Wrought-iron bar (Burden's). Mark,* 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	1,000	64,000	*a*	.2019	.1624	.1939	.0315	.0080	
			b	.2060	.1623	.1938	.0315	.0122	
			c	.2026	.1626	.1935	.0309	.0091	
	1,000	65,000	*a*	.1922	.1595	.1912	.0317	.0010	
			b	.2044	.1613	.1929	.0316	.0115	
			c	.2051	.1628	.1939	.0311	.0112	
	5,000	70,000	*a*	.1971	.1604	.1922	.0318	.0049	
			b	.2083	.1616	.1934	.0318	.0149	
			c	.2037	.1615	.1928	.0313	.0109	
									Bar annealed at temperature of 425° F.; seventh annealing.
40,000	0	70,000	*a*	.1999	.1696	.1998	.0302	.0001	
			b	.1991	.1685	.1986	.0301	.0005	
			c	.1992	.1688	.1988	.0300	.0004	
	1,000	71,000	*a*	.2035	.1657	.1968	.0311	.0067	
			b	.1994	.1640	.1951	.0311	.0043	
			c	.2018	.1653	.1960	.0307	.0058	
	1,000	72,000	*a*	.1944	.1616	.1933	.0317	.0011	
			b	.2050	.1628	.1942	.0314	.0108	
			c	.2033	.1636	.1948	.0312	.0085	
	1,000	73,000	*a*	.1926	.1601	.1916	.0315	.0010	
			b	.2044	.1619	.1934	.0315	.0110	
			c	.2045	.1630	.1942	.0312	.0103	
	1,000	74,000	*a*	.2040	.1621	.1937	.0316	.0103	
			b	.2065	.1621	.1936	.0315	.0129	
			c	.2025	.1619	.1931	.0312	.0094	
	1,000	75,000	*a*	.2072	.1624	.1943	.0319	.0129	
			b	.1998	.1608	.1924	.0316	.0074	
			c	.2040	.1620	.1932	.0312	.0108	
	5,000	80,000	*a*	.2064	.1589	.1966	.0377	.0098	
			b	.2090	.1611	.1933	.0322	.0157	
			c	.2063	.1592	.1962	.0270	.0071	
									Bar annealed at temperature of 425° F.; eighth annealing.

40,000	0	80,000	a	.1948	.1680	.1985	.0305	.0003	
			b	.1996	.1684	.1989	.0306	.0007	
			c	.2001	.1688	.1992	.0304	.0009	
	1,000	81,000	a	.2025	.1625	.1945	.0320	.0080	
			b	.2047	.1640	.1955	.0315	.0092	
			c	.2022	.1634	.1949	.0315	.0073	
	1,000	82,000	a	.1918	.1584	.1909	.0325	.0009	
			b	.2041	.1619	.1936	.0317	.0105	
			c	.2052	.1618	.1039	.0321	.0113	
	1,000	83,000	a	.1959	.1586	.1916	.0330	.0043	
			b	.2000	.1601	.1924	.0323	.0076	
			c	.2067	.1605	.1929	.0324	.0138	
	1,000	84,000	a	.2049	.1568	.1905	.0337	.0144	
			b	.2098	.1614	.1940	.0326	.0158	
			c	.2036	.1580	.1910	.0330	.0126	
	1,000	85,000	a	.2114	.1559	.1905	.0346	.0209	
			b	.2059	.1604	.1936	.0332	.0123	
			c	.2046	.1558	.1896	.0337	.0151	
	1,200	86,200	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 44.—*Wrought-iron shaft from rod No.* 1.

The conditions of this test were similar to the preceding, excepting the interval between annealings was increased to 20,000 rotations. Rupture occurred at 110,000 rotations.

No. 44.—*Wrought-iron bar (Burden's). Mark 1.*

This bar was crooked. Straightened cold before testing.

Diameter, 1″. Speed of rotation, 400 per miuute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1999	.1663	.1959	.0296	.0040	
			b	.2013	.1651	.1946	.0295	.0067	
			c	.2058	.1707	.2007	.0300	.0051	
	1,000	1,000	*a*	.2020	.1662	.1967	.0305	.0053	
			b	.2086	.1648	.1953	.0305	.0083	
			c	.2036	.1659	.1965	.0306	.0071	
	2,000	3,000	*a*	.1976	.1644	.1950	.0306	.0026	
			b	.1976	.1632	.1937	.0305	.0039	
			c	.2074	.1661	.1968	.0307	.0106	
	1,000	4,000	*a*	.1956	.1633	.1940	.0307	.0016	
			b	.2052	.1645	.1951	.0306	.0101	
			c	.2051	.1658	.1965	.0307	.0086	
	1,000	5,000	*a*	.2061	.1663	.1969	.0306	.0092	
			b	.2025	.1645	.1953	.0308	.0072	
			c	.2035	.1655	.1962	.0307	.0073	
	5,000	10,000	*a*	.2061	.1665	.1972	.0307	.0089	
			b	.1976	.1635	.1942	.0307	.0034	
			c	.2048	.1664	.1971	.0307	.0077	
	10,000	20,000	*a*	.1973	.1653	.1959	.0306	.0014	
			b	.1950	.1621	.1928	.0307	.0022	
			c	.2085	.1680	.1987	.0307	.0098	
40,000	0	20,000	*a*	.2009	.1708	.2008	.0300	.0001	Bar straightened and annealed at temperature of 415° F.; first annealing.
			b	.1983	.1681	.1981	.0300	.0002	
			c	.2009	.1708	.2007	.0299	.0002	
	1,000	21,000	*a*	.2000	.1698	.1999	.0301	.0001	
			b	.1981	.1674	.1974	.0300	.0007	
			c	.2018	.1697	.1998	.0301	.0020	

No. 44.—*Wrought-iron bar (Burden's). Mark* 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	1,000	22,000	*a*	.2004	.1694	.1997	.0303	.0007	
			b	.1995	.1672	.1973	.0301	.0022	
			c	.2018	.1690	.1993	.0303	.0025	
	1,000	23,000	*a*	.2010	.1690	.1993	.0303	.0017	
			b	.1998	.1667	.1970	.0303	.0028	
			c	.2019	.1684	.1988	.0304	.0031	
	1,000	24,000	*a*	.2033	.1691	.1993	.0302	.0040	
			b	.1991	.1665	.1967	.0302	.0024	
			c	.2023	.1679	.1985	.0306	.0038	
	1,000	25,000	*a*	.2036	.1688	.1991	.0303	.0045	
			b	.1988	.1663	.1965	.0302	.0023	
			c	.2024	.1676	.1983	.0307	.0041	
	5,000	30,000	*a*	.1989	.1664	.1970	.0306	.0019	
			b	.2023	.1653	.1959	.0306	.0064	
			c	.2030	.1664	.1971	.0307	.0059	
	10,000	40,000	*a*	.1976	.1645	.1951	.0306	.0025	
			b	.1972	.1628	.1936	.0308	.0036	
			c	.2064	.1660	.1969	.0309	.0095	
									Bar straightened and annealed at temperature of 415° F.; second annealing.
40,000	0	40,000	*a*	.2012	.1709	.2011	.0302	.0001	
			b	.1979	.1678	.1977	.0299	.0002	
			c	.2009	.1705	.2006	.0301	.0003	
	1,000	41,000	*a*	.2014	.1691	.1994	.0303	.0020	
			b	.1978	.1663	.1966	.0303	.0012	
			c	.2027	.1686	.1991	.0305	.0036	
	1,000	42,000	*a*	.2011	.1680	.1984	.0304	.0027	
			b	.1979	.1659	.1960	.0301	.0019	
			c	.2046	.1681	.1985	.0304	.0061	
	1,000	43,000	*a*	.2013	.1674	.1979	.0295	.0034	
			b	.1978	.1652	.1956	.0304	.0022	
			c	.2039	.1672	.1979	.0307	.0060	

1,000	44,000	a	.1962	.1667	.1973	.0306	.0009				
		b	.2018	.1656	.1962	.0306	.0056				
		c	.2032	.1666	.1975	.0309	.0057				
1,000	45,000	a	.2048	.1674	.1980	.0308	.0068				
		b	.2000	.1655	.1959	.0304	.0041				
		c	.2030	.1663	.1972	.0309	.0058				
5,000	50,000	a	.2018	.1659	.1965	.0306	.0053				
		b	.1976	.1665	.1944	.0309	.0032				
		c	.2035	.1663	.1970	.0307	.0065				
10,000	60,000	a	.1955	.1640	.1948	.0308	.0007				
		b	.1981	.1633	.1940	.0307	.0041				
		c	.2008	.1660	.1969	.0309	.0059				
						Bar annealed at temperature of 430° F.; third annealing.					
0	60,000	a	.2012	.1710	.2011	.0301	.0001				
		b	.1984	.1683	.1983	.0300	.0001				
		c	.2005	.1698	.2000	.0302	.0005				
1,000	61,000	a	.1987	.1677	.1982	.0305	.0005				
		b	.1967	.1660	.1958	.0303	.0024				
		c	.2024	.1673	.1978	.0306	.0056				
1,000	62,000	a	.2013	.1674	.1980	.0306	.0033				
		b	.2023	.1660	.1964	.0304	.0059				
		c	.2024	.1661	.1968	.0307	.0056				
1,000	63,000	a	.2045	.1668	.1975	.0307	.0070				
		b	.2021	.1654	.1960	.0306	.0061				
		c	.2028	.1657	.1966	.0309	.0063				
1,000	64,000	a	.2053	.1668	.1974	.0306	.0079				
		b	.2021	.1650	.1956	.0306	.0065				
		c	.2032	.1655	.1964	.0309	.0068				
1,000	65,000	a	.2042	.1661	.1969	.0308	.0073				
		b	.2028	.1647	.1956	.0309	.0072				
		c	.2034	.1651	.1963	.0311	.0072				
5,000	70,000	a	.2008	.1651	.1960	.0309	.0048				
		b	.2046	.1644	.1954	.0310	.0062				
		c	.2033	.1646	.1959	.0313	.0074				
10,000	80,000	a	.1968	.1642	.1953	.0310	.0016				
		b	.1988	.1634	.1941	.0307	.0047				
		c	.2001	.1656	.1965	.0309	.0036				
						Bar annealed at temperature of 425° F.; fourth annealing.					
0	80,000	a	.2003	.1701	.2002	.0301	.0001				
		b	.1991	.1690	.1989	.0299	.0002				
		c	.2009	.1704	.2005	.0301	.0004				
	40,000										

No. 44.—*Wrought-iron bar (Burden's). Mark*, 1—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	1,000	81,000	*a*	.2013	.1674	.1981	.0307	.0032	
			b	.2018	.1662	.1967	.0305	.0051	
			c	.2026	.1668	.1977	.0309	.0049	
	1,000	82,000	*a*	.1968	.1656	.1964	.0308	.0004	
			b	.1990	.1647	.1953	.0306	.0037	
			c	.2048	.1664	.1971	.0307	.0077	
	1,000	83,000	*a*	.2034	.1662	.1970	.0308	.0064	
			b	.2034	.1649	.1956	.0307	.0078	
			c	.2033	.1654	.1966	.0312	.0067	
	1,000	84,000	*a*	.2042	.1657	.1966	.0309	.0076	
			b	.2034	.1646	.1954	.0308	.0080	
			c	.2035	.1651	.1964	.0313	.0071	
	1,000	85,000	*a*	.1991	.1649	.1960	.0311	.0031	
			b	.2041	.1647	.1955	.0308	.0086	
			c	.2033	.1647	.1960	.0313	.0073	
	5,000	90,000	*a*	.2011	.1640	.1955	.0315	.0056	
			b	.2049	.1647	.1954	.0307	.0095	
			c	.2037	.1641	.1956	.0315	.0081	
	10,000	100,000	*a*	.2060	.1645	.1962	.0317	.0098	
			b	.1975	.1611	.1924	.0313	.0051	
			c	.2060	.1636	.1954	.0318	.0106	
40,000	0	100,000	*a*	.2008	.1699	.2006	.0307	.0002	Bar annealed at temperature of 425° F.; fifth annealing.
			b	.1988	.1684	.1985	.0301	.0003	
			c	.2012	.1698	.2006	.0308	.0006	
	1,000	101,000	*a*	.2048	.1677	.1968	.0311	.0060	
			b	.1994	.1656	.1962	.0306	.0032	
			c	.2028	.1658	.1974	.0316	.0054	
	1,000	102,000	*a*	.2060	.1666	.1981	.0315	.0079	
			b	.2012	.1647	.1956	.0309	.0056	
			c	.2030	.1645	.1962	.0317	.0068	

1,000	103,000	a	.2004	.1651	.1964	.0313	.0040			
		b	.1976	.1629	.1939	.0310	.0037			
		c	.2059	.1640	.1959	.0319	.0100			
1,000	104,000	a	.2068	.1657	.1973	.0316	.0067			
		b	.1985	.1638	.1943	.0310	.0043			
		c	.2041	.1630	.1963	.0328	.0088			
1,000	105,000	a	.2078	.1638	.1975	.0317	.0163			
		b	.2002	.1634	.1945	.0311	.0057			
		c	.2085	.1619	.1945	.0326	.0090			
5,000	110,000							Bar ruptured.		

No. 45.—*Wrought-iron bar (Burden's). Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Set.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1990	.1686	.1987	.0301	.0003	
			b	.2000	.1697	.1995	.0298	.0005	
			c	.1993	.1688	.1988	.0300	.0005	
	1,000	1,000	*a*	.2089	.1570	.1886	.0316	.0288	
			b	.2100	.1629	.1938	.0309	.0062	
			c	.2041	.1578	.1891	.0313	.0050	
	1,000	2,000	*a*	.1818	.1478	.1798	.0320	.0020	
			b	.2088	.1594	.1903	.0309	.0185	
			c	.2133	.1587	.1900	.0313	.0233	
	1,000	3,000	*a*	.2104	.1552	.1876	.0324	.0228	
			b	.1972	.1567	.1880	.0313	.0092	
			c	.2123	.1579	.1894	.0315	.0229	
	1,000	4,000	*a*	.2109	.1555	.1882	.0327	.0227	
			b	.1961	.1566	.1870	.0314	.0091	
			c	.2129	.1595	.1906	.0311	.0223	
	1,000	5,000	*a*	.1829	.1480	.1809	.0320	.0029	
			b	.2158	.1607	.1919	.0312	.0239	
			c	.2108	.1585	.1900	.0315	.0208	
	5,000	10,000	*a*	.2144	.1700	.2008	.0308	.0136	
			b	.1904	.1553	.1860	.0307	.0044	
			c	.2057	.1652	.1954	.0302	.0103	
	10,000	20,000	*a*	.1862	.1552	.1856	.0304	.0006	
			b	.2162	.1756	.2054	.0298	.0108	
			c	.2006	.1641	.1945	.0304	.0061	
	10,000	30,000	*a*	.1812	.1507	.1811	.0304	.0001	
			b	.2085	.1709	.2010	.0301	.0075	
			c	.2097	.1719	.2012	.0302	.0085	

10,000	40,000	a	.2117	.1661	.1973	.0312	.0144		
		b	.2086	.1706	.2012	.0304	.0074		
		c	.1938	.1556	.1866	.0310	.0072		
	50,000	a	.1668	.1568	.1868	.0310	.0020		
		b	.2173	.1752	.2040	.0308	.0133		
		c	.1965	.1610	.1924	.0314	.0061		
	53,950							Bar ruptured.	
8,950									

No. 46.—*Wrought-iron bar (Burden's). Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2003	.1699	.1999	.0300	.0004	
			b	.2003	.1702	.2000	.0298	.0003	
			c	.2004	.1698	.1998	.0300	.0006	
	1,000	1,000	*a*	.1950	.1569	.1881	.0312	.0069	
			b	.2131	.1630	.1936	.0306	.0195	
			c	.2085	.1567	.1886	.0319	.0199	
	1,000	2,000	*a*	.1862	.1508	.1821	.0313	.0041	
			b	.2163	.1613	.1920	.0317	.0243	
			c	.2130	.1571	.1889	.0318	.0241	
	1,000	3,000	*a*	.1816	.1489	.1804	.0315	.0012	
			b	.2085	.1588	.1897	.0309	.0188	
			c	.2170	.1586	.1901	.0315	.0269	
	1,000	4,000	*a*	.1995	.1552	.1866	.0314	.0129	
			b	.1912	.1515	.1828	.0313	.0084	
			c	.2211	.1602	.1917	.0315	.0294	
	1,000	5,000	*a*	.2182	.1654	.1959	.0305	.0223	
			b	.2078	.1621	.1931	.0310	.0147	
			c	.2045	.1543	.1861	.0318	.0184	
	5,000	10,000	*a*	.1884	.1559	.1863	.0304	.0021	
			b	.2188	.1723	.2023	.0300	.0165	
			c	.2043	.1613	.1926	.0313	.0117	
	10,000	20,000	*a*	.2141	.1762	.2065	.0303	.0076	
			b	.1862	.1539	.1843	.0304	.0019	
			c	.2064	.1678	.1981	.0303	.0083	
	10,000	30,000	*a*	.1963	.1634	.1935	.0303	.0028	
			b	.2188	.1792	.2092	.0304	.0091	
			c	.1947	.1571	.1883	.0303	.0064	

10,000	40,000	a	.2112	.1725	.3025	.0800	.0087			
		b	.2100	.1733	.2835	.0302	.0074			
6,800	46,800	c	.1914	.1528	.1840	.0612	.0074	Bar ruptured.		

TEST NO. 47.—*Wrought-iron shaft from rod No. 2.*

At intervals of 10,000 rotations the shaft was annealed at 425° F. with the same effects upon the sets as heretofore mentioned.

After completing 70,000 rotations the shaft rested without load a period of 44 days.

This prolonged rest appeared to have some influence upon the sets similar to annealing, but in a less marked manner.

At the time of the seventh annealing the bar was placed in a tank containing pine shavings to cool slowly.

The shavings, which had been heated by a gas burner under the tank, ignited, and may have temporarily raised the temperature of the shaft.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1994	.1691	.1990	.0299	.0004	
			b	.1997	.1693	.1993	.0300	.0004	
			c	.2002	.1697	.1996	.0299	.0006	
	10,000	10,000	*a*	.2055	.1578	.1893	.0315	.0162	
			b	.2150	.1652	.1960	.0308	.0190	
			c	.2030	.1577	.1893	.0316	.0137	
									Bar annealed at temperature of 425° F.; first annealing.
40,000	0	10,000	*a*	.2020	.1698	.1998	.0300	.0022	
			b	.1999	.1696	.1996	.0300	.0003	
			c	.1997	.1694	.1994	.0300	.0003	
	10,000	20,000	*a*	.2091	.1626	.1939	.0313	.0152	
			b	.1970	.1585	.1899	.0314	.0071	
			c	.2076	.1643	.1951	.0308	.0125	
									Bar annealed at temperature of 425° F.; second annealing.
40,000	0	20,000	*a*	.2006	.1703	.2003	.0300	.0003	
			b	.1994	.1690	.1990	.0300	.0004	
			c	.1998	.1695	.1994	.0299	.0004	
	10,000	30,000	*a*	.1869	.1546	.1860	.0314	.0009	
			b	.2065	.1615	.1929	.0314	.0136	
			c	.2096	.1652	.1960	.0308	.0136	
									Bar annealed at temperature of 425° F.; third annealing.
40,000	0	30,000	*a*	.1999	.1690	.1994	.0304	.0005	
			b	.2003	.1694	.1997	.0303	.0006	
			c	.1997	.1691	.1993	.0302	.0004	
	10,000	40,000	*a*	.2010	.1589	.1905	.0316	.0105	
			b	.1971	.1579	.1896	.0317	.0075	
			c	.2108	.1638	.1952	.0314	.0156	
									Suddenly quenched after each annealing up to this time; hereafter slowly cooled.
									Bar annealed at temperature of 425° F.; fourth annealing.

No. 47.—*Wrought-iron bar (Burden's). Mark*, 2—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	40,000	*a*	.1976	.1676	.1976	.0300	0.	
			b	.2027	.1717	.2019	.0302	.0008	
			c	.1990	.1686	.1986	.0300	.0004	
	10,000	50,000	*a*	.2019	.1594	.1911	.0317	.0108	
			b	.2113	.1642	.1954	.0312	.0159	
			c	.2031	.1605	.1921	.0316	.0110	
									Bar annealed at temperature of 425° F.; fifth annealing.
40,000	0	50,000	*a*	.1989	.1680	.1984	.0304	.0005	
			b	.2000	.1691	.1994	.0303	.0006	
			c	.2008	.1699	.2002	.0303	.0006	
	10,000	60,000	*a*	.2064	.1590	.1909	.0319	.0155	
			b	.2104	.1638	.1952	.0314	.0152	
			c	.2040	.1605	.1921	.0316	.0119	
									Bar annealed at temperature of 425° F.; sixth annealing.
40,000	0	60,000	*a*	.1968	.1684	.1982	.0298	.0000	
			b	.2008	.1704	.2001	.0297	.0007	
			c	.2003	.1698	.1997	.0299	.0006	
	10,000	70,000	*a*	.1852	.1533	.1850	.0317	.0002	
			b	.2092	.1624	.1939	.0315	.0153	
			c	.2089	.1623	.1941	.0318	.0148	
									Bar rested 44 days.
40,000	0	70,000	*a*	.2006	.1667	.1970	.0303	.0036	
			b	.2022	.1688	.1991	.0308	.0031	
			c	.2008	.1684	.1986	.0302	.0022	
	1,000	71,000	*a*	.1884	.1548	.1869	.0321	.0015	
			b	.2069	.1617	.1934	.0317	.0135	
			c	.2084	.1626	.1940	.0314	.0144	
	1,000	72,000	*a*	.1892	.1546	.1870	.0324	.0022	
			b	.2100	.1621	.1939	.0318	.0161	
			c	.2077	.1622	.1936	.0314	.0141	
	1,000	73,000	*a*	.1998	.1572	.1893	.0321	.0005	
			b	.1988	.1586	.1906	.0320	.0082	
			c	.2106	.1615	.1936	.0321	.0170	
									Heated to 425° in oil, and temperature maintained 1 hour, then put in hot shavings, which ignited, and temperature may have increased. Cooled slowly in oil from 425° F.; seventh annealing.

			c	.2002	.1701	.1999	.0298	.0003	
	1,000	74,000	*a*	.2010	.1647	.1958	.0311	.0052	
			b	.2008	.1664	.1971	.0307	.0037	
			c	.2028	.1673	.1978	.0305	.0050	
	1,000	75,000	*a*	.1929	.1608	.1920	.0312	.0009	
			b	.2051	.1647	.1958	.0311	.0093	
			c	.2044	.1651	.1962	.0311	.0082	
	1,000	76,000	*a*	.2057	.1611	.1931	.0320	.0126	
			b	.2009	.1627	.1942	.0315	.0067	
			c	.2052	.1637	.1950	.0313	.0102	
	7,000	83,000	*a*	.1933	.1559	.1885	.0326	.0048	
			b	.2132	.1641	.1960	.0319	.0172	
			c	.2050	.1604	.1926	.0322	.0124	
									Bar heated to temperature of 425° F. in oil, and maintained 1 hour; then slowly cooled in warm shavings; eighth annealing.
40,000	0	83,000	*a*	.2004	.1701	.2002	.0301	.0002	
			b	.2002	.1694	.1999	.0305	.0003	
			c	.1988	.1676	.1981	.0305	.0007	
	1,000	84,000	*a*	.2040	.1634	.1951	.0317	.0089	
			b	.2047	.1654	.1969	.0315	.0078	
			c	.2016	.1626	.1942	.0316	.0074	
	1,000	85,000	*a*	.2025	.1603	.1924	.0321	.0101	
			b	.2080	.1639	.1958	.0319	.0122	
			c	.2034	.1607	.1929	.0322	.0105	
	1,000	86,000	*a*	.1909	.1576	.1896	.0320	.0013	
			b	.2011	.1611	.1931	.0320	.0080	
			c	.2078	.1605	.1931	.0326	.0147	
	5,750	91,750	.....	.....	.....	.....	.....	.....	Bar ruptured

No. 48.—*Wrought-iron bar (Burden's). Mark, 2.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1994	.1691	.1991	.0300	.0003	
			b	.1988	.1683	.1981	.0298	.0007	
			c	.1995	.1689	.1989	.0300	.0006	
	20,000	20,000	*a*	.1925	.1618	.1921	.0303	.0004	
			b	.1873	.1550	.1853	.0303	.0020	
			c	.2178	.1784	.2081	.0297	.0097	
									Bar annealed at temperature of 425° F.; first annealing.
	0	20,000	*a*	.1998	.1698	.1995	.0297	.0003	
			b	.1982	.1676	.1974	.0298	.0008	
			c	.2000	.1698	.1996	.0298	.0004	
	20,000	40,000	*a*	.1925	.1602	.1904	.0302	.0021	
			b	.2151	.1671	.1972	.0301	.0179	
			c	.2006	.1616	.1926	.0310	.0080	
									Bar annealed at temperature of 425° F.; second annealing.
	0	40,000	*a*	.1971	.1671	.1969	.0298	.0002	
			b	.1992	.1689	.1988	.0299	.0004	
			c	.2010	.1707	.2005	.0296	.0005	
	17,500	57,500	.....	.....	.....	.....	.....	.....	Bar ruptured.

chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1995	.1698	.1991	.0298	.0004	
			b	.2001	.1697	.1995	.0298	.0006	
			c	.1997	.1694	.1992	.0298	.0005	
	30,000	30,000	*a*	.2004	.1654	.1957	.0303	.0047	
			b	.1886	.1538	.1850	.0312	.0036	
			c	.2133	.1725	.2026	.0301	.0107	
									Bar annealed at temperature of 425° F.; exposed to temperature of bath about 5 minutes.
	0	30,000	*a*	.1972	.1672	.1970	.0296	.0002	
			b	.2014	.1706	.2011	.0305	.0003	
			c	.2001	.1698	.1998	.0300	.0003	
	18,100	48,100	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 36.—*Wrought-iron shaft from rod No. 3.*

The test began with 20,000 pounds per square inch fiber stress, which was increased by 1,000 pounds per square inch increments after successive runs of 5,000 rotations.

Permanent sets, very slight at first, increased rapidly with loads at and above 27,000 pounds per square inch.

After the sets had reached considerable magnitude the bar was warmed while running, reaching a temperature at 90,000 rotations painful to the touch.

After 95,000 rotations the shaft rested without load a period of 4 days, resulting in a temporary and partial reduction of the sets.

Continuing the test the shaft ruptured at 129,500 rotations.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch*	
20,000	0	0	*a*	.1998	.1853	.1998	.0145	0.	
			b	.1999	.1849	.1997	.0148	.0002	
			c	.1992	.1844	.1992	.0148	0.	
	5,000	5,000	*a*	.1999	.1852	.1998	.0146	.0001	
			b	.1998	.1851	.1997	.0146	.0001	
			c	.1993	.1843	.1992	.0149	.0001	
21,000	0	0	*a*	.1999	.1843	.1998	.0155	.0001	
			b	.2000	.1848	.1998	.0155	.0002	
			c	.1994	.1838	.1993	.0155	.0001	
	5,000	10,000	*a*	.1999	.1843	.1998	.0155	.0001	
			b	.2000	.1844	.1998	.0154	.0002	
			c	.1993	.1837	.1992	.0155	.0001	
22,000	0	10,000	*a*	.2000	.1835	.1998	.0163	.0002	
			b	.2000	.1836	.1998	.0162	.0002	
			c	.1994	.1829	.1993	.0164	.0001	
	5,000	15,000	*a*	.1998	.1835	.1998	.0163	0.	
			b	.2000	.1837	.1998	.0161	.0002	
			c	.1993	.1829	.1993	.0164	0.	
23,000	0	15,000	*a*	.2000	.1828	.1998	.0170	.0002	
			b	.1999	.1828	.1998	.0170	.0001	
			c	.1994	.1822	.1993	.0171	.0001	
	5,000	20,000	*a*	.2001	.1826	.1998	.0172	.0003	
			b	.2000	.1828	.1998	.0170	.0002	
			c	.1994	.1824	.1993	.0169	.0001	
24,000	0	20,000	*a*	.2000	.1822	.1998	.0176	.0002	
			b	.2000	.1822	.1997	.0175	.0003	
			c	.1994	.1814	.1991	.0177	.0003	

30,000	5,000	50,000	a	.2009	.1708	.1985	.0216	.0024
			b	.2017	.1702	.1978	.0216	.0039
			c	.2006	.1705	.1980	.0215	.0026
	0	50,000	a	.2012	.1761	.1986	.0225	.0036
			b	.2015	.1753	.1975	.0222	.0040
			c	.2008	.1756	.1970	.0223	.0029
	5,000	55,000	a	.1975	.1745	.1973	.0228	.0002
			b	.2011	.1744	.1968	.0224	.0043
			c	.2018	.1750	.1974	.0224	.0044
31,000	0	55,000	a	.2015	.1749	.1980	.0231	.0045
			b	.2020	.1735	.1967	.0232	.0053
			c	.2014	.1742	.1973	.0231	.0041
	5,000	60,000	a	.1983	.1738	.1971	.0233	.0013
			b	.1993	.1726	.1957	.0231	.0041
			c	.2020	.1738	.1969	.0231	.0061
32,000	0	60,000	a	.2018	.1734	.1974	.0240	.0044
			b	.2024	.1717	.1958	.0241	.0060
			c	.2023	.1725	.1965	.0240	.0057
	5,000	65,000	a	.1967	.1714	.1959	.0245	.0008
			b	.1969	.1700	.1945	.0245	.0054
			c	.2040	.1721	.1962	.0241	.0078
33,000	0	65,000	a	.2030	.1719	.1969	.0250	.0061
			b	.2024	.1698	.1948	.0250	.0076
			c	.2029	.1713	.1959	.0247	.0070
	5,000	70,000	a	.2047	.1700	.1962	.0255	.0065
			b	.2041	.1688	.1949	.0251	.0092
			c	.2024	.1702	.1952	.0250	.0072
34,000	0	70,000	a	.2033	.1703	.1968	.0260	.0069
			b	.2035	.1685	.1944	.0259	.0091
			c	.2031	.1694	.1953	.0259	.0081
	5,000	75,000	a	.1932	.1664	.1923	.0259	.0009
			b	.2045	.1672	.1932	.0260	.0113
			c	.2058	.1699	.1956	.0257	.0102
35,000	0	75,000	a	.2033	.1689	.1954	.0265	.0079
			b	.2043	.1673	.1939	.0266	.0104
			c	.2036	.1687	.1950	.0268	.0086
	5,000	80,000	a	.2075	.1693	.1968	.0270	.0113
			b	.2012	.1660	.1932	.0272	.0080
			c	.2036	.1681	.1948	.0267	.0068

No. 36.—*Wrought-iron bar (Burden's). Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
36,000	0	80,000	*a*	.1954	.1688	.1953	.0265	.0005	
			b	.2013	.1726	.1990	.0264	.0053	
			c	.2018	.1705	.1971	.0266	.0047	
	5,000	85,000	*a*	.1990	.1652	.1931	.0279	.0059	
			b	.1980	.1620	.1901	.0281	.0079	
			c	.2094	.1668	.1946	.0278	.0148	
37,000	0	85,000	*a*	.2049	.1660	.1947	.0287	.0102	
			b	.2048	.1633	.1919	.0286	.0129	
			c	.2049	.1656	.1940	.0284	.0109	
	5,000	90,000	*a*	.1923	.1633	.1918	.0285	.0005	
			b	.1980	.1638	.1917	.0279	.0063	
			c	.2098	.1675	.1955	.0280	.0143	
38,000	0	90,000	*a*	.2030	.1646	.1939	.0293	.0091	
			b	.2050	.1638	.1929	.0291	.0121	
			c	.2054	.1654	.1947	.0293	.0107	
									Bar quite hot, so that it pained the hand. Cooled with water before measuring.
	5,000	95,000	*a*	.1874	.1581	.1870	.0299	.0004	
			b	.2085	.1654	.1938	.0284	.0147	
			c	.2088	.1672	.1959	.0287	.0129	
									Bar rested 4 days.
	0	95,000	*a*	.2008	.1698	.1980	.0282	.0028	
			b	.2036	.1723	.2003	.0280	.0033	
			c	.2088	.1677	.1962	.0285	.0026	
	200	95,200	*a*	.2037	.1657	.1951	.0294	.0086	
			b	.2040	.1669	.1962	.0293	.0078	
			c	.2028	.1662	.1955	.0293	.0078	
	200	95,400	*a*	.2042	.1651	.1945	.0294	.0098	
			b	.2048	.1658	.1953	.0295	.0095	
			c	.2034	.1656	.1951	.0295	.0083	
	200	95,600	*a*	.1952	.1628	.1924	.0296	.0028	
			b	.2000	.1652	.1947	.0295	.0143	
			c	.2041	.1651	.1947	.0296	.0094	

200	95, 800	a	.1955	.1637	.1931	.0294	.0024			
		b	.2002	.1638	.1933	.0295	.0069			
		c	.2069	.1657	.1953	.0296	.0116			
200	96, 000	a	.1953	.1634	.1933	.0298	.0021			
		b	.2006	.1637	.1933	.0296	.0073			
		c	.2067	.1654	.1950	.0296	.0117			
0	96, 000	a	.2023	.1636	.1940	.0304	.0062			
		b	.2054	.1632	.1936	.0304	.0118			
		c	.2052	.1640	.1946	.0306	.0106			
4, 000	100, 000	a	.1976	.1598	.1904	.0306	.0072			
		b	.1951	.1564	.1868	.0304	.0083			
		c	.2137	.1639	.1945	.0306	.0192			
0	100, 000	a	.2056	.1604	.1920	.0316	.0136			
		b	.2058	.1582	.1897	.0315	.0161			
		c	.2064	.1616	.1931	.0315	.0153			
5, 000	105, 000	a	.1945	.1604	.1906	.0302	.0039			
		b	.2211	.1602	.1991	.0290	.0220			
		c	.1963	.1559	.1871	.0312	.0092			
0	105, 000	a	.2050	.1630	.1949	.0319	.0101			
		b	.2118	.1634	.1953	.0319	.0165			
		c	.1997	.1558	.1879	.0321	.0118			
5, 000	110, 000	a	.2062	.1602	.2006	.0313	.0057			
		b	.1821	.1474	.1786	.0312	.0035			
		c	.2154	.1714	.2021	.0307	.0133			
0	110, 000	a	.2088	.1630	.2003	.0323	.0085			
		b	.1918	.1500	.1823	.0323	.0046			
		c	.2163	.1673	.1998	.0325	.0105			
5, 000	115, 000	a	.1946	.1618	.1937	.0319	.0000			
		b	.1836	.1497	.1808	.0311	.0022			
		c	.2223	.1776	.2090	.0295	.0133			
0	115, 000	a	.2014	.1617	.1960	.0343	.0054			
		b	.1900	.1518	.1841	.0328	.0068			
		c	.2154	.1729	.2059	.0330	.0095			
5, 000	120, 000	a	.2007	.1638	.1978	.0340	.0029			
		b	.1773	.1408	.1733	.0345	.0040			
		c	.2243	.1770	.2091	.0321	.0152			
0	120, 000	a	.2068	.1658	.1995	.0337	.0073			
		b	.1864	.1443	.1780	.0337	.0084			
		c	.2162	.1727	.2062	.0335	.0100			

No. 36.—*Wrought-iron bar (Burden's). Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
	5,000	125,000	*a*	.2161	.1728	.2058	.0330	.0103	
			b	.2132	.1711	.2044	.0333	.0088	
			c	.1841	.1391	.1778	.0387	.0063	
45,000	0	125,000	*a*	.2113	.1701	.2041	.0340	.0072	
			b	.2116	.1686	.2030	.0344	.0086	
			c	.1859	.1438	.1785	.0347	.0074	
	4,500	129,500	.....	.....	.....	.....	.....	.....	Bar ruptured.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2001	.1691	.1994	.0303	.0007	
			b	.2001	.1696	.1996	.0300	.0005	
			c	.2004	.1696	.1992	.0296	.0012	
	1,000	1,000	*a*	.1759	.1468	.1724	.0316	.0035	Temperature of bar increased rapidly.
			b	.2118	.1572	.1869	.0297	.0249	
			c	.2225	.1533	.1846	.0313	.0379	
	1,000	2,000	*a*	.2122	.1598	.1905	.0307	.0217	
			b	.2185	.1637	.1945	.0308	.0240	
			c	.2083	.1479	.1798	.0319	.0285	
	1,000	3,000	*a*	.2211	.1610	.1926	.0316	.0285	
			b	.2017	.1580	.1894	.0314	.0123	
			c	.2090	.1528	.1843	.0315	.0247	
	1,000	4,000	*a*	.1986	.1534	.1849	.0315	.0137	
			b	.2235	.1646	.1955	.0309	.0270	
			c	.2067	.1506	.1822	.0314	.0245	
	1,000	5,000	*a*	.1891	.1491	.1810	.0319	.0081	
			b	.1948	.1540	.1849	.0309	.0099	
			c	.2241	.1559	.1873	.0314	.0368	
	5,000	10,000	*a*	.2140	.1743	.2042	.0299	.0098	Bar hot; painful to the touch. Cooled with water before measuring.
			b	.2124	.1744	.2044	.0300	.0080	
			c	.1888	.1555	.1813	.0258	.0075	
	10,000	20,000	*a*	.2075	.1710	.2008	.0298	.0067	
			b	.2152	.1775	.2076	.0301	.0076	
			c	.1876	.1520	.1823	.0303	.0053	
	10,000	30,000	*a*	.2084	.1714	.2018	.0304	.0066	
			b	.1862	.1538	.1838	.0305	.0024	
			c	.2119	.1715	.2017	.0302	.0102	

No. 37.—*Wrought-iron bar (Burden's). Mark*, 3—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	10,000	40,000	*a*	.1791	.1485	.1790	.0305	.0001	
			b	.2117	.1701	.2014	.0313	.0103	
			c	.2127	.1718	.2026	.0308	.0101	
	3,300	43,300	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 38.—*Wrought-iron bar (Burden's). Mark, 3.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1988	.1691	.1985	.0294	.0003	
			b	.1990	.1684	.1983	.0299	.0007	
			c	.1997	.1686	.1984	.0298	.0013	
									Temperature of bar increased rapidly.
	1,000	1,000	*a*	.2208	.1553	.1864	.0311	.0344	
			b	.2150	.1566	.1877	.0311	.0273	
			c	.2073	.1470	.1788	.0318	.0285	
	1,000	2,000	*a*	.2057	.1593	.1902	.0309	.0155	
			b	.1986	.1517	.1832	.0315	.0154	
			c	.2142	.1553	.1863	.0310	.0279	
	1,000	3,000	*a*	.1983	.1555	.1868	.0313	.0115	
			b	.2162	.1624	.1931	.0307	.0231	
			c	.2040	.1497	.1814	.0317	.0226	
	1,000	4,000	*a*	.1833	.1500	.1815	.0315	.0018	
			b	.1927	.1539	.1847	.0308	.0080	
			c	.2216	.1590	.1898	.0308	.0318	
	1,000	5,000	*a*	.1889	.1517	.1831	.0314	.0058	
			b	.2183	.1619	.1928	.0309	.0255	
			c	.2080	.1539	.1855	.0316	.0225	
									Bar hot; painful to the touch. Cooled with water.
	5,000	10,000	*a*	.1976	.1648	.1949	.0301	.0027	
			b	.1860	.1535	.1838	.0303	.0022	
			c	.2163	.1793	.2086	.0293	.0077	
	10,000	20,000	*a*	.1918	.1594	.1918	.0319	.0005	
			b	.1860	.1546	.1846	.0300	.0014	
			c	.2195	.1789	.2082	.0293	.0113	
	10,000	30,000	*a*	.2138	.1743	.2038	.0295	.0100	
			b	.2073	.1707	.2011	.0304	.0062	
			c	.1890	.1519	.1826	.0307	.0064	
	7,200	37,200	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 39.— *Wrought-iron bar (Burden's). Mark, 3.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1996	.1701	.1988	.0287	.0008	
			b	.2004	.1701	.1995	.0294	.0009	
			c	.2004	.1696	.1994	.0298	.0010	
	1,000	1,000	*a*	.1951	.1565	.1870	.0305	.0081	
			b	.1878	.1456	.1766	.0310	.0112	
			c	.2250	.1675	.1974	.0299	.0276	
	1,000	2,000	*a*	.1913	.1564	.1868	.0304	.0045	
			b	.1917	.1496	.1804	.0309	.0113	
			c	.2238	.1692	.1990	.0298	.0248	
	1,000	3,000	*a*	.1876	.1538	.1852	.0314	.0024	
			b	.1920	.1516	.1825	.0309	.0095	
			c	.2228	.1686	.1986	.0300	.0242	
	1,000	4,000	*a*	.2212	.1619	.1973	.0354	.0239	
			b	.2037	.1575	.1885	.0310	.0152	
			c	.2048	.1582	.1896	.0313	.0152	
	1,000	5,000	*a*	.1847	.1494	.1808	.0314	.0039	
			b	.2232	.1576	.1890	.0314	.0342	
			c	.2124	.1621	.1935	.0314	.0189	
	5,000	10,000	*a*	.2019	.1654	.1951	.0297	.0068	Bar very hot. Cooled with water.
			b	.2185	.1734	.2032	.0298	.0153	
			c	.1945	.1583	.1862	.0300	.0083	
	10,000	20,000	*a*	.2042	.1676	.1975	.0299	.0067	
			b	.2158	.1753	.2051	.0298	.0107	
			c	.1924	.1554	.1861	.0307	.0063	
	11,000	31,000	*a*	.1935	.1629	.1932	.0303	.0002	
			b	.1889	.1578	.1874	.0301	.0015	
			c	.2181	.1790	.2088	.0296	.0092	Rested 13 days.

0	31,000	a	.2003	.1700	.1909	.0299	.0004	Bar straightened and then annealed at temperature of 500° F.	
		b	.1904	.1691	.1868	.0297	.0006		
		c	.2013	.1709	.2068	.0289	.0005		
1,000	32,000	a	.2053	.1642	.1953	.0311	.0100		
		b	.1996	.1618	.1923	.0310	.0075		
		c	.2067	.1675	.1985	.0310	.0082		
1,000	33,000	a	.2040	.1628	.1938	.0310	.0102		
		b	.2052	.1612	.1922	.0310	.0130		
		c	.2069	.1660	.1980	.0311	.0069		
1,000	34,000	a	.2073	.1633	.1943	.0310	.0130		
		b	.2011	.1594	.1907	.0313	.0104		
		c	.2081	.1664	.1978	.0309	.0108		
1,000	35,000	a	.1979	.1604	.1915	.0311	.0064		
		b	.1988	.1567	.1883	.0316	.0105		
		c	.2120	.1661	.1972	.0311	.0143		
5,000	40,000	a	.1976	.1579	.1894	.0315	.0084		
		b	.2154	.1615	.1924	.0309	.0280		
		c	.2056	.1660	.1928	.0319	.0128		
10,000	50,000	a	.2186	.1724	.2035	.0311	.0101		
		b	.1858	.1490	.1806	.0316	.0053		
			.2112	.1663	.1963	.0320	.0119		
1,500	51,500							Bar ruptured.	

No. 40.— *Wrought-iron bar (Burden's). Mark*, 3.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2004	.1702	.2000	.0298	.0004	
			b	.2004	.1691	.1990	.0299	.0014	
			c	.2005	.1695	.1995	.0300	.0010	
	1,000	1,000	*a*	.1798	.1418	.1732	.0314	.0066	
			b	.2304	.1843	.1853	.0310	.0451	
			c	.2171	.1586	.1898	.0312	.0273	
	1,000	2,000	*a*	.2078	.1654	.1958	.0304	.0120	
			b	.1923	.1474	.1788	.0314	.0135	
			c	.2155	.1653	.1958	.0305	.0197	
	1,000	3,000	*a*	.1843	.1561	.1828	.0267	.0015	
			b	.1977	.1480	.1797	.0317	.0180	
			c	.2225	.1613	.1925	.0312	.0300	
	1,000	4,000	*a*	.1789	.1440	.1753	.0313	.0016	
			b	.2208	.1558	.1866	.0308	.0342	
			c	.2174	.1625	.1984	.0359	.0190	
	1,000	5,000	*a*	.1968	.1533	.1858	.0325	.0110	
			b	.2234	.1584	.1897	.0313	.0337	
			c	.2068	.1562	.1881	.0319	.0187	
	5,000	10,000	*a*	.2180	.1768	.2067	.0299	.0113	
			b	.2044	.1674	.1976	.0302	.0068	
			c	.1918	.1550	.1859	.0309	.0059	
	10,000	20,000	*a*	.1885	.1563	.1864	.0301	.0021	
			b	.2241	.1815	.2113	.0298	.0128	
			c	.1953	.1597	.1906	.0309	.0047	
	0	20,000	*a*	.1987	.1688	.1980	.0292	.0007	Bar straightened and then annealed at temperature of 599° F.
			b	.2017	.1715	.2014	.0299	.0003	
			c	.2006	.1699	.1998	.0299	.0008	

1,000	21,000	a	.2010	.1623	.1931	.0308	.0079			
		b	.2067	.1619	.1978	.0350	.0100			
		c	.2031	.1646	.1958	.0312	.0078			
1,000	22,000	a	.1895	.1569	.1882	.0313	.0013			
		b	.2108	.1627	.1941	.0314	.0167			
		c	.2060	.1640	.1953	.0313	.0116			
1,000	23,000	a	.2091	.1610	.1927	.0317	.0164			
		b	.2045	.1600	.1920	.0320	.0125			
		c	.2063	.1621	.1939	.0313	.0124			
1,000	24,000	a	.2105	.1602	.1922	.0320	.0183			
		b	.2048	.1596	.1906	.0320	.0142			
		c	.2070	.1613	.1931	.0318	.0139			
1,000	25,000	a	.1937	.1575	.1894	.0319	.0043			
		b	.1997	.1556	.1877	.0321	.0120			
		c	.2119	.....	.1941	.....	.....			
5,000	30,000	a	.2162	.1655	.1970	.0315	.0192			
		b	.1973	.1558	.1876	.0318	.0097			
		c	.2062	.1611	.1933	.0322	.0129			
9,400	33,400		.....	.....	.....	.....	.....	Bar ruptured.		

No. 60.—*Wrought-iron bar (Burden's). Mark, 4.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	0	0	*a*	.1998	.1731	.1996	.0265	.0003	
			b	.2005	.1736	.2001	.0265	.0004	
			c	.2003	.1731	.1996	.0265	.0007	
	1,000	1,000	*a*	.1947	.1667	.1937	.0270	.0010	
			b	.2028	.1685	.1955	.0270	.0073	
			c	.2057	.1676	.1947	.0271	.0110	
	1,000	2,000	*a*	.1941	.1659	.1933	.0274	.0008	
			b	.2019	.1678	.1949	.0271	.0070	
			c	.2065	.1676	.1947	.0271	.0118	
	1,000	3,000	*a*	.1996	.1661	.1934	.0278	.0062	
			b	.1989	.1663	.1934	.0271	.0055	
			c	.2033	.1677	.1948	.0271	.0135	
	1,000	4,000	*a*	.2056	.1683	.1955	.0272	.0101	
			b	.2017	.1681	.1951	.0270	.0066	
			c	.2054	.1677	.1948	.0271	.0106	
	1,000	5,000	*a*	.2051	.1682	.1956	.0274	.0095	
			b	.2011	.1685	.1954	.0269	.0057	
			c	.2048	.1677	.1949	.0272	.0099	
	5,000	10,000	*a*	.2054	.1687	.1961	.0274	.0093	
			b	.2029	.1694	.1964	.0270	.0065	
			c	.2037	.1684	.1956	.0272	.0081	
	10,000	20,000	*a*	.2020	.1680	.1956	.0276	.0064	
			b	.1996	.1679	.1952	.0273	.0044	
			c	.2056	.1691	.1965	.0274	.0090	
	10,000	30,000	*a*	.1968	.1179	.1951	.0272	.0017	
			b	.2052	.1700	.1971	.0271	.0081	
			c	.2035	.1695	.1966	.0271	.0069	

10,000	40,000	a	.2008	.1685	.1961	.0276	.0047		
		b	.2044	.1700	.1972	.0272	.0073		
		c	.2027	.1689	.1963	.0274	.0064		
10,000	50,000	a	.1948	.1686	.1941	.0278	.0007		
		b	.2034	.1697	.1967	.0270	.0067		
		c	.2048	.1688	.1968	.0270	.0080		
10,000	60,000	a	.1949	.1689	.1943	.0274	.0006		
		b	.2034	.1699	.1969	.0270	.0065		
		c	.2045	.1698	.1969	.0271	.0076		
10,000	70,000	a	.1963	.1675	.1950	.0275	.0018		
		b	.2047	.1698	.1972	.0274	.0075		
		c	.2034	.1694	.1968	.0274	.0066		
10,000	80,000	a	.1961	.1688	.1963	.0275	.0018		
		b	.2040	.1706	.1978	.0272	.0063		
		c	.2025	.1696	.1968	.0272	.0057		
10,000	90,000	a	.1956	.1677	.1953	.0276	.0003		
		b	.2015	.1698	.1972	.0274	.0043		
		c	.2041	.1697	.1971	.0274	.0070		
10,000	100,000	a	.2035	.1690	.1966	.0276	.0060		
		b	.2034	.1701	.1976	.0275	.0058		
		c	.2027	.1691	.1966	.0275	.0061		
10,000	110,000	a	.1953	.1673	.1948	.0275	.0005		
		b	.2025	.1697	.1972	.0275	.0056		
		c	.2039	.1695	.1969	.0274	.0070		
10,000	120,000	a	.1961	.1686	.1963	.0277	.0028		
		b	.2046	.1701	.1976	.0275	.0070		
		c	.2026	.1692	.1967	.0275	.0059		
10,000	130,000	a	.2018	.1685	.1963	.0278	.0055		
		b	.1998	.1694	.1961	.0277	.0037		
		c	.2043	.1695	.1970	.0275	.0078		
10,000	140,000	a	.1959	.1673	.1951	.0278	.0008		
		b	.2031	.1688	.1966	.0278	.0065		
		c	.2041	.1696	.1971	.0275	.0070		
10,000	150,000	a	.1967	.1670	.1956	.0286	.0011		
		b	.2034	.1640	.1934	.0294	.0100		
		c	.2050	.1684	.1964	.0280	.0066		
2,850	152,850							Bar ruptured.	

No. 61. — *Wrought-iron bar (Burden's). Mark*, 4.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	0	0	*a*	.2006	.1740	.2004	.0264	.0002	
			b	.2005	.1737	.2001	.0264	.0004	
			c	.2005	.1736	.1998	.0262	.0007	
	1,000	1,000	*a*	.1964	.1669	.1939	.0270	.0025	
			b	.1997	.1678	.1948	.0270	.0049	
			c	.2078	.1684	.1954	.0270	.0124	
	1,000	2,000	*a*	.1944	.1663	.1936	.0273	.0008	
			b	.2017	.1682	.1951	.0269	.0066	
			c	.2067	.1684	.1954	.0270	.0113	
	1,000	3,000	*a*	.1946	.1658	.1930	.0272	.0016	
			b	.2055	.1690	.1959	.0269	.0096	
			c	.2059	.1687	.1957	.0270	.0102	
	1,000	4,000	*a*	.1976	.1664	.1936	.0272	.0040	
			b	.2009	.1675	.1946	.0271	.0054	
			c	.2081	.1689	.1959	.0270	.0122	
	1,000	5,000	*a*	.1944	.1665	.1938	.0273	.0006	
			b	.2012	.1683	.1953	.0270	.0059	
			c	.2070	.1691	.1961	.0270	.0109	
	5,000	10,000	*a*	.2043	.1685	.1959	.0274	.0084	
			b	.2045	.1698	.1969	.0271	.0076	
			c	.2038	.1693	.1964	.0271	.0074	
	10,000	20,000	*a*	.2038	.1701	.1973	.0272	.0065	
			b	.2016	.1709	.1979	.0270	.0037	
			c	.2027	.1704	.1974	.0270	.0053	
	0	20,000	*a*	.2011	.1729	.1995	.0266	.0016	Bar rested 36 days.
			b	.2012	.1737	.2000	.0263	.0012	
			c	.2008	.1735	.1997	.0262	.0011	

1,000	21,000	*a*	.1989	.1713	.1979	.0266	.0010
		b	.2009	.1721	.1990	.0269	.0019
		c	.2026	.1721	.1988	.0267	.0038
1,000	22,000	*a*	.2030	.1715	.1984	.0269	.0046
		b	.2017	.1723	.1991	.0268	.0026
		c	.2020	.1719	.1987	.0268	.0033
1,000	23,000	*a*	.2028	.1713	.1981	.0268	.0047
		b	.2025	.1722	.1991	.0269	.0034
		c	.2019	.1716	.1984	.0268	.0035
0	23,000	*a*	.2013	.1748	.2010	.0262	.0003
		b	.2003	.1740	.2001	.0261	.0002
		c	.2003	.1739	.2000	.0261	.0003
1,000	24,000	*a*	.1998	.1732	.1996	.0264	.0002
		b	.2006	.1732	.1995	.0263	.0011
		c	.2015	.1729	.1993	.0264	.0022
1,000	25,000	*a*	.2017	.1728	.1994	.0266	.0023
		b	.2018	.1733	.1996	.0263	.0022
		c	.2014	.1725	.1990	.0265	.0024
1,000	26,000	*a*	.1989	.1720	.1988	.0268	.0001
		b	.2010	.1728	.1992	.0264	.0018
		c	.2020	.1724	.1990	.0266	.0030
1,000	27,000	*a*	.1993	.1719	.1987	.0268	.0006
		b	.2022	.1728	.1993	.0265	.0029
		c	.2018	.1722	.1988	.0266	.0030
1,000	28,000	*a*	.1985	.1713	.1982	.0269	.0003
		b	.2013	.1726	.1990	.0267	.0023
		c	.2024	.1719	.1987	.0268	.0037
5,000	33,000	*a*	.2034	.1714	.1985	.0271	.0049
		b	.2020	.1723	.1990	.0267	.0030
		c	.2021	.1717	.1984	.0267	.0037
10,000	43,000	*a*	.2024	.1708	.1979	.0271	.0045
		b	.2032	.1718	.1988	.0270	.0044
		c	.2022	.1709	.1980	.0271	.0042
0	43,000	*a*	.1997	.1733	.1997	.0264	0.
		b	.2008	.1743	.2006	.0263	.0002
		c	.2006	.1741	.2002	.0261	.0004

Bar heated in oil bath to 500° F., and kept at that temperature 1 hour. Cooled slowly in oil bath; first annealing.

Bar annealed same manner as before, at temperature of 500° F.; second annealing.

No. 61.—*Wrought-iron bar (Burden's). Mark, 4*—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	1,000	44,000	*a*	.1990	.1720	.1986	.0266	.0004	
			b	.2015	.1929	.1995	.0266	.0020	
			c	.2014	.1728	.1993	.0265	.0021	
	1,000	45,000	*a*	.1986	.1716	.1983	.0267	.0003	
			b	.2006	.1724	.1991	.0267	.0015	
			c	.2019	.1724	.1989	.0265	.0030	
	1,000	46,000	*a*	.1999	.1713	.1982	.0269	.0017	
			b	.2005	.1720	.1988	.0268	.0017	
			c	.2024	.1721	.1988	.0267	.0036	
	1,000	47,000	*a*	.1984	.1709	.1979	.0270	.0005	
			b	.2006	.1719	.1984	.0269	.0018	
			c	.2024	.1716	.1986	.0270	.0038	
	1,000	48,000	*a*	.1984	.1712	.1979	.0267	.0005	
			b	.2007	.1718	.1987	.0269	.0020	
			c	.2024	.1717	.1985	.0268	.0039	
	5,000	53,000	*a*	.2013	.1710	.1981	.0271	.0032	
			b	.2024	.1717	.1987	.0270	.0037	
			c	.2018	.1711	.1981	.0270	.0037	
	10,000	63,000	*a*	.2018	.1705	.1976	.0271	.0042	
			b	.2004	.1708	.1979	.0271	.0025	
			c	.2028	.1710	.1980	.0270	.0048	
									Bar annealed same manner as before, at temperature of 500° F.; third annealing.
	0	63,000	*a*	.2025	.1757	.2020	.0263	.0005	
			b	.1985	.1723	.1984	.0262	.0001	
			c	.2008	.1738	.1999	.0261	.0004	
	1,000	64,000	*a*	.2002	.1726	.1994	.0268	.0008	
			b	.2012	.1719	.1985	.0266	.0027	
			c	.2013	.1724	.1989	.0265	.0024	
	1,000	65,000	*a*	.1992	.1721	.1987	.0266	.0005	
			b	.2016	.1718	.1984	.0266	.0032	
			c	.2018	.1720	.1987	.0267	.0031	

No. 61.—*Wrought-iron bar (Burden's). Mark,* 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	10,000	103,000	*a*	.2031	.1715	.1984	.0269	.0047	
			b	.2013	.1715	.1985	.0270	.0028	
			c	.2019	.1716	.1984	.0268	.0035	
									Bar annealed same manner as before at temperature of 500° F.; fifth annealing.
	0	103,000	*a*	.2004	.1738	.2003	.0265	.0001	
			b	.2006	.1739	.2003	.0264	.0003	
			c	.2007	.1739	.2002	.0263	.0005	
	1,000	104,000	*a*	.2021	.1723	.1992	.0269	.0029	
			b	.2008	.1725	.1991	.0266	.0017	
			c	.2015	.1724	.1990	.0266	.0025	
	1,000	105,000	*a*	.2028	.1722	.1990	.0268	.0038	
			b	.2015	.1722	.1990	.0268	.0025	
			c	.2016	.1721	.1989	.0268	.0027	
	1,000	106,000	*a*	.1985	.1714	.1981	.0267	.0004	
			b	.2017	.1720	.1989	.0269	.0028	
			c	.2022	.1719	.1989	.0270	.0033	
	1,000	107,000	*a*	.1982	.1712	.1979	.0267	.0003	
			b	.2015	.1721	.1988	.0267	.0027	
			c	.2023	.1719	.1987	.0268	.0036	
	1,000	108,000	*a*	.1988	.1712	.1981	.0269	.0007	
			b	.2005	.1717	.1986	.0269	.0019	
			c	.2027	.1719	.1987	.0268	.0040	
	5,000	113,000	*a*	.1999	.1708	.1979	.0271	.0020	
			b	.2004	.1713	.1983	.0270	.0021	
			c	.2031	.1717	.1987	.0270	.0044	
	10,000	123,000	*a*	.1977	.1704	.1975	.0271	.0002	
			b	.2010	.1713	.1984	.0271	.0026	
			c	.2030	.1717	.1987	.0270	.0043	
									Bar annealed same manner as before at temperature of 500° F.; sixth annealing.
	0	123,000	*a*	.2001	.1735	.2000	.0265	.0001	
			b	.2008	.1740	.2005	.0268	.0003	
			c	.2010	.1743	.2004	.0267	.0004	

1,000	125,000	a	.2017	.1725	.1965	.0270	.0024				
		b	.2000	.1713	.1964	.0271	.0016				
		c	.2005	.1718	.1969	.0271	.0016				
			.2025	.1720	.1991	.0271	.0034				
1,000	126,000	a	.2026	.1715	.1969	.0274	.0027				
		b	.2013	.1720	.1991	.0271	.0023				
		c	.2019	.1719	.1980	.0271	.0029				
1,000	127,000	a	.1998	.1711	.1963	.0271	.0016				
		b	.2005	.1718	.1957	.0269	.0010				
		c	.2023	.1718	.1969	.0271	.0039				
1,000	128,000	a	.2006	.1713	.1968	.0270	.0028				
		b	.2005	.1715	.1966	.0271	.0019				
		c	.2026	.1717	.1988	.0271	.0068				
57,500	185,500							Bar ruptured.			

No. 62.—*Wrought-iron bar (Burden's). Mark*, 4.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	0	0	*a*	.1999	.1734	.1996	.0262	.0008	
			b	.1999	.1733	.1995	.0262	.0004	
			c	.2000	.1732	.1995	.0263	.0005	
	1,000	1,000	*a*	.1950	.1673	.1944	.0271	.0006	
			b	.2014	.1662	.1933	.0271	.0081	
			c	.2053	.1698	.1968	.0270	.0085	
	1,000	2,000	*a*	.1992	.1674	.1946	.0272	.0046	
			b	.1990	.1650	.1921	.0271	.0069	
			c	.2067	.1695	.1965	.0270	.0102	
	1,000	3,000	*a*	.2029	.1683	.1955	.0272	.0074	
			b	.1985	.1648	.1920	.0272	.0065	
			c	.2061	.1696	.1966	.0270	.0095	
	1,000	4,000	*a*	.1979	.1673	.1945	.0272	.0034	
			b	.1993	.1654	.1925	.0271	.0068	
			c	.2064	.1696	.1966	.0270	.0098	
	1,000	5,000	*a*	.2002	.1674	.1947	.0273	.0055	
			b	.1986	.1649	.1921	.0272	.0065	
			c	.2066	.1696	.1966	.0270	.0100	
	5,000	10,000	*a*	.1944	.1656	.1932	.0276	.0012	
			b	.2053	.1672	.1944	.0272	.0109	
			c	.2046	.1700	.1971	.0271	.0075	
	10,000	20,000	*a*	.1998	.1680	.1953	.0273	.0045	
			b	.1989	.1663	.1936	.0273	.0053	
			c	.2056	.1699	.1971	.0272	.0085	
	0	20,000	*a*	.1997	.1725	.1990	.0265	.0007	Bar rested 35 days.
			b	.2002	.1722	.1986	.0264	.0016	
			c	.2009	.1730	.1995	.0265	.0014	

1,000	22,000	a	.2010	.1710	.1985	.0269	.0061		
		b	.1966	.1705	.1974	.0260	.0012		
		c	.2026	.1702	.1970	.0268	.0056		
			.2019	1717	.1984	.0267	.0035		
1,000	23,000	a	.1976	.1704	.1972	.0269	.0068		
		b	.2000	.1695	.1964	.0260	.0038		
		c	.2027	.1718	.1968	.0270	.0044		
								Bar heated in oil bath to 500° F. and kept at that temperature 1 hour; cooled alo wly in oil bath; first annealing.	
0	23,000	a	.2000	.1735	.1998	.0263	.0002		
		b	.2000	.1737	.1989	.0252	.0001		
		c	.2001	.1737	.1990	.0262	.0002		
1,000	24,000	a	.1996	.1726	.1990	.0264	.0006		
		b	.2012	.1724	.1995	.0262	.0026		
		c	.2008	.1726	.1992	.0266	.0016		
1,000	25,000	a	.1988	.1719	.1984	.0265	.0004		
		b	.2015	.1717	.1981	.0264	.0034		
		c	.2012	.1726	.1990	.0264	.0022		
1,000	26,000	a	.2018	.1719	.1985	.0266	.0033		
		b	.2012	.1715	.1979	.0264	.0033		
		c	.2007	.1720	.1985	.0266	.0021		
1,000	27,000	a	.1996	.1714	.1982	.0268	.0014		
		b	.1990	.1710	.1975	.0265	.0024		
		c	.2019	.1721	.1988	.0267	.0031		
1,000	28,000	a	.2012	.1715	.1984	.0269	.0028		
		b	.1995	.1717	.1973	.0255	.0023		
		c	.2021	.1723	.1988	.0266	.0033		
5,000	33,000	a	.1983	.1706	.1974	.0268	.0009		
		b	.2026	.1705	.1972	.0267	.0054		
		c	.2019	.1716	.1984	.0268	.0025		
10,000	43,000	a	.2011	.1708	.1973	.0270	.0038		
		b	.2029	.1702	.1970	.0268	.0059		
		c	.2019	.1713	.1981	.0268	.0038		
								Bar annealed same manner as before at temperature of 500° F.; second annealing.	
0	43,000	a	.1997	.1733	.1995	.0262	.0002		
		b	.1998	.1734	.1995	.0261	.0003		
		c	.2000	.1736	.1998	.0262	.0002		

No. 62.—*Wrought-iron bar (Burden's). Mark, 4*—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	1,000	44,000	*a*	.2012	.1720	.1987	.0267	.0025	
			b	.2010	.1716	.1980	.0264	.0030	
			c	.2008	.1723	.1988	.0265	.0020	
	1,000	45,000	*a*	.1992	.1713	.1982	.0269	.0010	
			b	.1998	.1706	.1974	.0268	.0024	
			c	.2015	.1718	.1985	.0267	.0030	
	1,000	46,000	*a*	.1993	.1712	.1979	.0267	.0014	
			b	.1996	.1703	.1970	.0267	.0026	
			c	.2018	.1716	.1983	.0267	.0035	
	1,000	47,000	*a*	.2012	.1711	.1980	.0269	.0032	
			b	.1995	.1702	.1968	.0266	.0027	
			c	.2019	.1715	.1983	.0268	.0036	
	1,000	48,000	*a*	.1976	.1701	.1972	.0271	.0004	
			b	.2019	.1704	.1970	.0266	.0049	
			c	.2016	.1715	.1982	.0267	.0034	
	5,000	53,000	*a*	.2019	.1707	.1978	.0271	.0041	
			b	.1993	.1693	.1962	.0269	.0031	
			c	.2022	.1714	.1961	.0267	.0041	
	10,000	63,000	*a*	.1974	.1700	.1969	.0269	.0005	
			b	.1999	.1694	.1963	.0269	.0036	
			c	.2026	.1718	.1981	.0263	.0045	
	0	63,000	*a*	.2017	.1754	.2015	.0261	.0002	Bar annealed same manner as before at temperature of 500° F.; third annealing.
			b	.1976	.1713	.1973	.0260	.0008	
			c	.2005	.1739	.2002	.0263	.0003	
	1,000	64,000	*a*	.2019	.1726	.1993	.0267	.0026	
			b	.1988	.1699	.1966	.0267	.0022	
			c	.2015	.1722	.1989	.0266	.0026	
	1,000	65,000	*a*	.1994	.1711	.1980	.0269	.0004	
			b	.2010	.1701	.1966	.0267	.0043	
			c	.2013	.1715	.1986	.0268	.0029	

1,000	66,000	a	.2025	.1717	.1997	.0270	.0038		
		b	.1992	.1699	.1966	.0267	.0026		
		c	.2016	.1717	.1985	.0268	.0031		
1,000	67,000	a	.2008	.1710	.1981	.0271	.0027		
		b	.2016	.1700	.1969	.0269	.0047		
		c	.2015	.1715	.1984	.0269	.0031		
1,000	68,000	a	.2024	.1712	.1983	.0271	.0041		
		b	.2014	.1699	.1966	.0267	.0043		
		c	.2014	.1714	.1982	.0268	.0062		
5,000	72,000	a	.1978	.1704	.1975	.0271	.0003		
		b	.1999	.1692	.1963	.0271	.0036		
		c	.2024	.1712	.1983	.0271	.0041		
10,000	83,000	a	.2016	.1703	.1975	.0272	.0041		
		b	.1993	.1688	.1959	.0271	.0034		
		c	.2027	.1712	.1981	.0269	.0046		
							Bar annealed same manner as before at temperature of 500° F.; fourth annealing.		
0	83,000	a	.2000	.1734	.1998	.0264	.0002		
		b	.1996	.1733	.1994	.0261	.0002		
		c	.2004	.1736	.2000	.0264	.0004		
1,000	84,000	a	.2020	.1721	.1989	.0268	.0031		
		b	.2003	.1710	.1978	.0268	.0025		
		c	.2019	.1722	.1988	.0266	.0022		
1,000	85,000	a	.1986	.1711	.1981	.0271	.0005		
		b	.2017	.1706	.1974	.0268	.0043		
		c	.2015	.1720	.1948	.0268	.0027		
1,000	86,000	a	.2016	.1715	.1984	.0269	.0032		
		b	.1985	.1704	.1969	.0265	.0026		
		c	.2019	.1720	.1987	.0267	.0032		
1,000	87,000	a	.2003	.1711	.1980	.0269	.0023		
		b	.1991	.1700	.1968	.0268	.0023		
		c	.2022	.1718	.1986	.0268	.0026		
1,000	88,000	a	.2020	.1713	.1984	.0271	.0036		
		b	.1994	.1696	.1965	.0269	.0029		
		c	.2023	.1719	.1985	.0267	.0038		
5,000	93,000	a	.1973	.1699	.1970	.0271	.0003		
		b	.2008	.1698	.1967	.0269	.0041		
		c	.2024	.1711	.1983	.0272	.0041		
10,000	103,000	a	.1971	.1695	.1966	.0271	.0005		
		b	.2025	.1699	.1967	.0268	.0058		
		c	.2022	.1710	.1982	.0272	.0040		

No. 62.—*Wrought-iron bar (Burden's). Mark*, 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
									Bar annealed same manner as before at temperature of 500° F.; fifth annealing.
35,000	0	103,000	*a*	.2003	.1738	.2001	.0263	.0002	
			b	.1996	.1731	.1993	.0262	.0003	
			c	.2002	.1734	.1998	.0264	.0004	
	1,000	104,000	*a*	.1986	.1714	.1985	.0271	.0001	
			b	.2001	.1708	.1974	.0266	.0027	
			c	.2015	.1721	.1988	.0267	.0027	
	1,000	105,000	*a*	.1988	.1714	.1984	.0270	.0004	
			b	.1997	.1704	.1971	.0267	.0026	
			c	.2018	.1719	.1986	.0267	.0032	
	1,000	106,000	*a*	.1984	.1708	.1978	.0270	.0006	
			b	.2021	.1705	.1973	.0268	.0048	
			c	.2015	.1715	.1985	.0270	.0030	
	1,000	107,000	*a*	.2003	.1710	.1981	.0271	.0022	
			b	.1996	.1698	.1968	.0270	.0028	
			c	.2022	.1715	.1985	.0270	.0037	
	1,000	108,000	*a*	.1987	.1706	.1977	.0271	.0010	
			b	.2022	.1703	.1971	.0268	.0051	
			c	.2017	.1713	.1984	.0271	.0033	
	5,000	113,000	*a*	.2004	.1703	.1977	.0274	.0027	
			b	.1994	.1693	.1964	.0271	.0030	
			c	.2025	.1715	.1983	.0268	.0042	
	10,000	123,000	*a*	.2034	.1704	.1780	.0276	.0054	
			b	.2005	.1697	.1968	.0271	.0037	
			c	.2020	.1713	.1982	.0269	.0038	
									Bar annealed same manner as before at temperature of 500° F.; sixth annealing.
	0	123,000	*a*	.2004	.1735	.2001	.0266	.0003	
			b	.1999	.1729	.1994	.0265	.0005	
			c	.1998	.1730	.1995	.0265	.0003	

1,000	124,000	a	.2005	.1714	.1985	.0271	.0020		
		b	.1995	.1703	.1972	.0269	.0024		
		c	.2016	.1718	.1988	.0270	.0028		
1,000	125,000	a	.1984	.1708	.1980	.0272	.0004		
		b	.1998	.1702	.1970	.0268	.0028		
		c	.2019	.1717	.1985	.0268	.0034		
1,000	126,000	a	.2028	.1708	.1982	.0274	.0046		
		b	.1999	.1699	.1970	.0271	.0030		
		c	.2017	.1715	.1986	.0270	.0032		
1,000	127,000	a	.1977	.1701	.1975	.0274	.0002		
		b	.2007	.1699	.1970	.0271	.0037		
		c	.2021	.1715	.1985	.0270	.0036		
1,000	128,000	a	.1991	.1702	.1977	.0275	.0014		
		b	.2023	.1700	.1971	.0271	.0052		
		c	.2016	.1714	.1985	.0271	.0081		
17,850	145,850							Bar ruptured.	

No. 63.—*Wrought-iron bar (Burden's). Mark*, 4.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end-bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	0	0	*a*	.2000	.1734	.1997	.0263	.0003	
			b	.2006	.1739	.2002	.0263	.0004	
			c	.2002	.1736	.1998	.0262	.0004	
	1,000	1,000	*a*	.2053	.1689	.1960	.0271	.0093	
			b	.2009	.1676	.1947	.0271	.0062	
			c	.2039	.1704	.1973	.0269	.0066	
	1,000	2,000	*a*	.2049	.1669	.1941	.0272	.0108	
			b	.2056	.1678	.1948	.0270	.0108	
			c	.2040	.1696	.1966	.0270	.0074	
	1,000	3,000	*a*	.2014	.1668	.1941	.0273	.0073	
			b	.1999	.1659	.1931	.0272	.0068	
			c	.2063	.1696	.1967	.0269	.0096	
	1,000	4,000	*a*	.2045	.1669	.1941	.0272	.0104	
			b	.2059	.1678	.1949	.0271	.0110	
			c	.2039	.1693	.1964	.0271	.0075	
	1,000	5,000	*a*	.1946	.1661	.1936	.0275	.0010	
			b	.2013	.1672	.1943	.0271	.0070	
			c	.2060	.1698	.1968	.0270	.0092	
	5,000	10,000	*a*	.2029	.1671	.1945	.0274	.0084	
			b	.2060	.1685	.1957	.0272	.0103	
			c	.2032	.1693	.1965	.0272	.0067	
	10,000	20,000	*a*	.2005	.1676	.1949	.0273	.0056	
			b	.2055	.1692	.1964	.0272	.0091	
			c	.2031	.1697	.1968	.0271	.0063	
	10,000	30,000	*a*	.1954	.1675	.1949	.0274	.0005	
			b	.2003	.1686	.1958	.0272	.0045	
			c	.2950	.1795	.1876	.0271	.0074	

10,000	40,000	*a*	.1942	.1661	.1935	.0274	.0007	
		b	.2042	.1688	.1962	.0274	.0080	
		c	.2043	.1704	.1976	.0272	.0067	
0	40,000	*a*	.2023	.1743	.2006	.0263	.0017	Bar rested 23 days.
		b	.2010	.1728	.1993	.0265	.0017	
		c	.1995	.1714	.1979	.0265	.0016	
1,000	41,000	*a*	.2020	.1716	.1982	.0266	.0038	
		b	.2023	.1712	.1982	.0270	.0041	
		c	.2014	.1712	.1981	.0269	.0033	
1,000	42,000	*a*	.2022	.1710	.1978	.0268	.0044	
		b	.2025	.1711	.1980	.0269	.0045	
		c	.2017	.1710	.1980	.0270	.0037	
1,000	43,000	*a*	.1995	.1706	.1975	.0269	.0020	
		b	.2030	.1709	.1978	.0269	.0052	
		c	.2018	.1710	.1981	.0271	.0037	
0	43,000	*a*	.2006	.1743	.2003	.0262	.0001	Bar heated in oil bath to 500° F. and kept at that temperature 1 hour; cooled slowly in oil bath; first annealing.
		b	.2001	.1739	.2000	.0261	.0001	
		c	.2000	.1736	.1997	.0261	.0003	
1,000	44,000	*a*	.2018	.1733	.1998	.0265	.0020	
		b	.2001	.1726	.1989	.0263	.0012	
		c	.2010	.1728	.1992	.0264	.0018	
1,000	45,000	*a*	.2015	.1726	.1992	.0266	.0026	
		b	.2015	.1724	.1988	.0264	.0027	
		c	.2010	.1723	.1988	.0265	.0022	
1,000	46,000	*a*	.1993	.1721	.1987	.0266	.0006	
		b	.2021	.1720	.1986	.0266	.0035	
		c	.2012	.1719	.1987	.0268	.0025	
1,000	47,000	*a*	.2016	.1719	.1986	.0267	.0030	
		b	.2020	.1720	.1985	.0265	.0035	
		c	.2011	.1718	.1984	.0266	.0027	
1,000	48,000	*a*	.1995	.1716	.1984	.0268	.0011	
		b	.2005	.1715	.1981	.0266	.0024	
		c	.2019	.1718	.1986	.0268	.0033	
3,000	53,000	*a*	.1974	.1702	.1972	.0270	.0002	
		b	.2016	.1712	.1978	.0266	.0038	
		c	.2022	.1714	.1982	.0268	.0040	
10,000	63,000	*a*	.2042	.1710	.1980	.0270	.0062	
		b	.2014	.1708	.1975	.0267	.0039	
		c	.2019	.1712	.1982	.0270	.0037	

No. 63.—*Wrought-iron bar (Burden's). Mark 4*—Continued.

Maximum fiber stress per square inch	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	10,000	73,000	*a*	.2028	.1704	.1974	.0270	.0054	
			b	.2004	.1698	.1969	.0271	.0035	
			c	.2028	.1709	.1979	.0270	.0049	
	10,000	83,000	*a*	.2021	.1700	.1972	.0272	.0049	
			b	.2003	.1696	.1966	.0270	.0037	
			c	.2033	.1708	.1980	.0272	.0053	
									Bar annealed same manner as before at temperature of 500° F.; second annealing.
	0	83,000	*a*	.2004	.1741	.2003	.0262	.0001	
			b	.1997	.1733	.1995	.0262	.0002	
			c	.2001	.1739	.1998	.0259	.0003	
	1,000	84,000	*a*	.2007	.1723	.1989	.0266	.0018	
			b	.2013	.1720	.1985	.0265	.0028	
			c	.2008	.1723	.1988	.0265	.0020	
	1,000	85,000	*a*	.2023	.1719	.1987	.0268	.0036	
			b	.2008	.1714	.1980	.0266	.0028	
			c	.2012	.1718	.1986	.0268	.0026	
	1,000	86,000	*a*	.2000	.1716	.1979	.0263	.0021	
			b	.2019	.1713	.1981	.0268	.0038	
			c	.2013	.1716	.1984	.0268	.0029	
	1,000	87,000	*a*	.2017	.1715	.1982	.0267	.0035	
			b	.2002	.1709	.1976	.0267	.0026	
			c	.2018	.1713	.1983	.0270	.0035	
	1,000	88,000	*a*	.2014	.1710	.1979	.0269	.0035	
			b	.2002	.1707	.1974	.0267	.0028	
			c	.2020	.1714	.1982	.0268	.0038	
	5,000	93,000	*a*	.2038	.1706	.1977	.0271	.0061	
			b	.2018	.1707	.1976	.0269	.0042	
			c	.2015	.1709	.1979	.0270	.0036	
	10,000	103,000	*a*	.1964	.1689	.1961	.0272	.0003	
			b	.2024	.1703	.1972	.0269	.0052	
			c	.2026	.1709	.1979	.0270	.0047	

		c	.2026	.1709	.1978	.0269	.0048				
10,000	122,000	a	.1971	.1690	.1960	.0270	.0011				
		b	.2040	.1704	.1973	.0269	.0067				
		c	.2024	.1706	.1976	.0270	.0048				
								Bar annealed same manner as before at temperature of 500° F.; third annealing.			
0	123,000	a	.1967	.1733	.1985	.0262	.0003				
		b	.1986	.1732	.1992	.0260	.0004				
		c	.2011	.1745	.2008	.0263	.0003				
1,000	124,000	a	.1993	.1715	.1981	.0266	.0012				
		b	.2017	.1717	.1994	.0267	.0033				
		c	.2016	.1725	.1992	.0267	.0024				
1,000	125,000	a	.1988	.1707	.1976	.0260	.0012				
		b	.2023	.1714	.1981	.0267	.0042				
		c	.2015	.1719	.1987	.0268	.0028				
1,000	126,000	a	.2009	.1709	.1976	.0267	.0033				
		b	.2002	.1707	.1975	.0268	.0027				
		c	.2023	.1718	.1986	.0268	.0037				
1,000	127,000	a	.1983	.1702	.1973	.0270	.0011				
		b	.2004	.1706	.1975	.0269	.0029				
		c	.2025	.1715	.1985	.0270	.0040				
1,000	128,000	a	.1988	.1700	.1970	.0270	.0018				
		b	.2028	.1707	.1978	.0271	.0050				
		c	.2019	.1713	.1983	.0270	.0036				
5,000	133,000	a	.2028	.1705	.1975	.0270	.0053				
		b	.2002	.1700	.1970	.0270	.0033				
		c	.2023	.1712	.1982	.0270	.0041				
10,000	143,000	a	.2042	.1700	.1975	.0275	.0067				
		b	.2014	.1700	.1972	.0272	.0042				
		c	.2020	.1708	.1979	.0271	.0041				
10,000	153,000	a	.1960	.1682	.1955	.0273	.0005				
		b	.2032	.1700	.1971	.0271	.0061				
		c	.2028	.1705	.1977	.0272	.0051				
10,000	163,000	a	.2002	.1695	.1966	.0271	.0036				
		b	.1997	.1690	.1963	.0273	.0034				
		c	.2035	.1707	.1977	.0270	.0058				
								Bar annealed same manner as before at temperature of 500° F., fourth annealing.			

No. 63.—*Wrought iron bar (Burden's). Mark*, 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	0	163,000	*a*	.2004	.1739	.2003	.0264	.0001	
			b	.2001	.1734	.1997	.0263	.0004	
			c	.2002	.1736	.1999	.0263	.0003	
	1,000	164,000	*a*	.2004	.1717	.1986	.0269	.0018	
			b	.2005	.1714	.1981	.0267	.0024	
			c	.2015	.1719	.1986	.0267	.0029	
	1,000	165,000	*a*	.1984	.1710	.1981	.0271	.0003	
			b	.2006	.1709	.1979	.0270	.0027	
			c	.2017	.1715	.1984	.0269	.0033	
	1,000	166,000	*a*	.2030	.1711	.1984	.0273	.0046	
			b	.2016	.1709	.1880	.0271	.0036	
			c	.2015	.1713	.1982	.0269	.0033	
	1,000	167,000	*a*	.2034	.1710	.1983	.0273	.0051	
			b	.2016	.1708	.1979	.0271	.0037	
			c	.2015	.1713	.1983	.0270	.0032	
	1,000	168,000	*a*	.2014	.1710	.1980	.0270	.0034	
			b	.2022	.1708	.1978	.0270	.0044	
			c	.2014	.1715	.1949	.0267	.0025	
	5,000	173,000	*a*	.2037	.1709	.1980	.0271	.0057	
			b	.2006	.1700	.1972	.0272	.0036	
			c	.2020	.1710	.1981	.0271	.0039	
	10,000	183,000	*a*	.2028	.1697	.1973	.0276	.0055	
			b	.2025	.1689	.1971	.0282	.0054	
			c	.2020	.1703	.1979	.0276	.0041	
	10,000	193,000	*a*	.2039	.1694	.1972	.0278	.0067	
			b	.2021	.1664	.1958	.0294	.0063	
			c	.2023	.1705	.1982	.0277	.0041	
	8,300	201,300	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 64.—*Wrought-iron bar (Burden's). Mark, 4.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	0	0	*a*	.1998	.1730	.1994	.0264	.0004	
			b	.2006	.1738	.2000	.0262	.0006	
			c	.2002	.1732	.1996	.0264	.0006	
	1,000	1,000	*a*	.1935	.1644	.1915	.0271	.0020	
			b	.2020	.1675	.1945	.0270	.0075	
			c	.2066	.1684	.1954	.0270	.0112	
	1,000	2,000	*a*	.1912	.1624	.1896	.0272	.0016	
			b	.2060	.1679	.1950	.0271	.0110	
			c	.2065	.1685	.1955	.0270	.0110	
	1,000	3,000	*a*	.1959	.1649	.1920	.0271	.0039	
			b	.2085	.1688	.1959	.0271	.0126	
			c	.2044	.1685	.1954	.0269	.0090	
	1,000	4,000	*a*	.2067	.1671	.1941	.0270	.0126	
			b	.2055	.1688	.1959	.0271	.0096	
			c	.2037	.1685	.1954	.0269	.0083	
	1,000	5,000	*a*	.2005	.1656	.1930	.0274	.0075	
			b	.2004	.1674	.1944	.0270	.0060	
			c	.2068	.1689	.1960	.0271	.0108	
	15,000	10,000	.....	.....	.....	.....	.....	.....	Bar rested 15 hours.
	0	10,000	*a*	.1974	.1697	.1963	.0266	.0011	After 15 hours' rest.
			b	.2067	.1743	.2006	.0263	.0061	
			c	.1999	.1706	.1966	.0266	.0033	
	10,000	20,000	*a*	.2014	.1682	.1954	.0272	.0060	
			b	.2002	.1686	.1957	.0271	.0045	
			c	.2046	.1700	.1970	.0270	.0076	

No. 64.—*Wrought-iron bar (Burden's). Mark, 4*—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	10,000	30,000	*a*	.2021	.1688	.1950	.0273	.0062	
			b	.2000	.1685	.1958	.0273	.0042	
			c	.2040	.1701	.1972	.0271	.0068	
	10,000	40,000	*a*	.2048	.1692	.1965	.0273	.0083	
			b	.2026	.1699	.1972	.0273	.0054	
			c	.2024	.1701	.1972	.0271	.0052	
	0	40,000	*a*	.2025	.1745	.2009	.0264	.0016	Bar rested 23 days.
			b	.2012	.1728	.1994	.0266	.0018	
			c	.1990	.1710	.1975	.0265	.0015	
	1,000	41,000	*a*	.2011	.1716	.1986	.0270	.0025	
			b	.2023	.1717	.1986	.0269	.0037	
			c	.2009	.1710	.1979	.0269	.0030	
	1,000	42,000	*a*	.2018	.1717	.1985	.0268	.0028	
			b	.2024	.1716	.1985	.0269	.0039	
			c	.2010	.1710	.1979	.0269	.0031	
	1,000	43,000	*a*	.2022	.1714	.1984	.0270	.0038	
			b	.2025	.1713	.1983	.0270	.0042	
			c	.2010	.1709	.1978	.0269	.0032	
	0	43,000	*a*	.1998	.1736	.1996	.0260	.0002	Bar heated in oil bath to 500° F. and kept at that temperature 1 hour; cooled slowly in oil bath; first annealing.
			b	.2010	.1746	.2006	.0260	.0004	
			c	.2001	.1735	.1998	.0263	.0003	
	1,000	44,000	*a*	.2018	.1726	.1990	.0264	.0028	
			b	.2014	.1727	.1994	.0267	.0020	
			c	.2008	.1724	.1989	.0265	.0019	
	1,000	45,000	*a*	.2023	.1724	.1989	.0265	.0034	
			b	.2011	.1724	.1989	.0265	.0022	
			c	.2009	.1722	.1986	.0264	.0023	
	1,000	46,000	*a*	.2007	.1716	.1984	.0268	.0023	
			b	.2007	.1719	.1986	.0267	.0021	
			c	.2015	.1719	.1985	.0266	.0030	

1,000	47,000	a	2008	.1717	.1984	.0267	.0024		
		b	2007	.1716	.1984	.0268	.0028		
		c	2016	.1716	.1984	.0268	.0033		
1,000	48,000	a	1985	.1713	.1978	.0265	.0027		
		b	2020	.1719	.1986	.0267	.0044		
		c	2013	.1719	.1985	.0266	.0023		
5,000	53,000	a	1978	.1708	.1975	.0267	.0008		
		b	2017	.1714	.1983	.0269	.0034		
		c	2018	.1716	.1983	.0267	.0035		
10,000	63,000	a	1985	.1704	.1973	.0269	.0013		
		b	2037	.1714	.1988	.0269	.0054		
		c	2016	.1714	.1980	.0266	.0035		
10,000	73,000	a	2022	.1711	.1978	.0267	.0044		
		b	2006	.1705	.1977	.0272	.0029		
		c	2021	.1718	.1980	.0267	.0041		
10,000	83,000	a	2021	.1706	.1975	.0269	.0046		
		b	2003	.1706	.1974	.0268	.0034		
		c	2024	.1713	.1979	.0267	.0045		
								Bar annealed same manner as before at temperature of 540° F.; second annealing.	
0	83,000	a	1995	.1730	.1998	.0263	.0002		
		b	2002	.1737	.1999	.0262	.0003		
		c	2002	.1736	.1999	.0263	.0003		
1,000	84,000	a	2016	.1718	.1984	.0266	.0033		
		b	2006	.1719	.1985	.0266	.0021		
		c	2010	.1723	.1987	.0265	.0032		
1,000	85,000	a	2011	.1711	.1978	.0267	.0038		
		b	2023	.1715	.1984	.0269	.0038		
		c	2011	.1716	.1984	.0268	.0027		
1,000	86,000	a	2023	.1713	.1980	.0267	.0043		
		b	2006	.1711	.1980	.0269	.0026		
		c	2013	.1715	.1983	.0268	.0030		
1,000	87,000	a	1971	.1700	.1969	.0269	.0002		
		b	2016	.1710	.1979	.0269	.0037		
		c	2018	.1714	.1982	.0268	.0036		
1,000	88,000	a	2019	.1707	.1975	.0268	.0044		
		b	2028	.1711	.1980	.0269	.0043		
		c	2013	.1714	.1980	.0266	.0032		
5,000	93,000	a	2032	.1706	.1976	.0270	.0056		
		b	2016	.1707	.1978	.0271	.0038		
		c	2013	.1710	.1978	.0268	.0035		

No. 64.—*Wrought-iron bar (Burden's). Mark*, 4—Continued.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
35,000	10,000	103,000	*a*	.1978	.1700	.1969	.0269	.0009	
			b	.2006	.1705	.1975	.0270	.0031	
			c	.2023	.1711	.1979	.0268	.0044	
	10,000	113,000	*a*	.2003	.1700	.1969	.0269	.0034	
			b	.2005	.1704	.1971	.0267	.0034	
			c	.2024	.1709	.1078	.0269	.0046	
	10,000	123,000	*a*	.2037	.1707	.1976	.0269	.0061	
			b	.2011	.1704	.1975	.0271	.0036	
			c	.2016	.1709	.1978	.0269	.0038	
									Bar annealed same manner as before at temperature of 500° F.; third annealing.
	0	123,000	*a*	.2001	.1737	.1999	.0262	.0002	
			b	.1985	.1716	.1981	.0265	.0004	
			c	.2016	.1747	.2011	.0264	.0005	
	1,000	124,000	*a*	.1980	.1709	.1978	.0269	.0002	
			b	.2001	.1709	.1977	.0268	.0024	
			c	.2021	.1726	.1991	.0265	.0030	
	1,000	125,000	*a*	.2021	.1715	.1981	.0266	.0040	
			b	.2015	.1709	.1977	.0268	.0038	
			c	.2015	.1721	.1987	.0266	.0028	
	1,000	126,000	*a*	.1975	.1702	.1971	.0269	.0004	
			b	.2018	.1708	.1976	.0268	.0042	
			c	.2020	.1718	.1986	.0268	.0034	
	1,000	127,000	*a*	.1985	.1708	.1975	.0267	.0010	
			b	.2002	.1706	.1974	.0268	.0028	
			c	.2022	.1719	.1985	.0266	.0037	
	1,000	128,000	*a*	.2029	.1711	.1980	.0269	.0049	
			b	.2011	.1707	.1976	.0269	.0035	
			c	.2015	.1717	.1983	.0266	.0033	
	5,000	133,000	*a*	.2030	.1708	.1977	.0269	.0053	
			b	.2006	.1705	.1975	.0270	.0033	
			c	.2016	.1714	.1981	.0267	.0035	

	10,000	143,000	a	.1993	.1699	.1970	.0271	.0023	
			b	.2002	.1700	.1970	.0270	.0032	
			c	.2026	.1711	.1980	.0269	.0046	
	10,000	153,000	a	.2028	.1707	.1978	.0271	.0050	
			b	.2005	.1699	.1971	.0272	.0034	
			c	.2017	.1710	.1979	.0269	.0038	
	10,000	163,000	a	.1983	.1698	.1969	.0271	.0014	
			b	.2034	.1703	.1976	.0273	.0058	
			c	.2016	.1710	.1978	.0268	.0038	
									Bar annealed same manner as before at temperature of 500° F.; fourth annealing.
	0	163,000	a	.1998	.1733	.1996	.0263	.0002	
			b	.2004	.1734	.1999	.0265	.0005	
			c	.2002	.1734	.1998	.0264	.0004	
	1,000	164,000	a	.1984	.1710	.1979	.0269	.0005	
			b	.2020	.1712	.1985	.0273	.0035	
			c	.2012	.1720	.1986	.0266	.0026	
	1,000	165,000	a	.1979	.1706	.1975	.0269	.0004	
			b	.2021	.1707	.1982	.0275	.0039	
			c	.2015	.1716	.1985	.0269	.0030	
	1,000	166,000	a	.2002	.1709	.1977	.0268	.0025	
			b	.2023	.1709	.1982	.0273	.0041	
			c	.2012	.1715	.1984	.0269	.0038	
	1,000	167,000	a	.1984	.1706	.1977	.0271	.0007	
			b	.2005	.1705	.1978	.0273	.0027	
			c	.2020	.1715	.1984	.0269	.0036	
	1,000	168,000	a	.1986	.1706	.1975	.0269	.0011	
			b	.2026	.1706	.1980	.0274	.0046	
			c	.2014	.1714	.1983	.0269	.0031	
	5,000	173,000	a	.2007	.1704	.1977	.0273	.0030	
			b	.2001	.1696	.1973	.0277	.0028	
			c	.2022	.1713	.1983	.0270	.0039	
	10,000	183,000	a	.2024	.1705	.1981	.0276	.0043	
			b	.2024	.1678	.1964	.0286	.0060	
			c	.2015	.1707	.1978	.0271	.0037	
	8,600	191,600	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 65.—*Wrought-iron bar (Burden's). Mark*, 5.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
30,000	0	0	*a*	.1999	.1773	.1997	.0224	.0002	
			b	.2001	.1774	.1998	.0224	.0003	
			c	.2002	.1775	.1999	.0224	.0003	
	1,000	1,000	*a*	.1998	.1771	.1995	.0224	.0003	
			b	.2004	.1771	.1996	.0225	.0008	
			c	.2005	.1768	.1993	.0225	.0012	
	1,000	2,000	*a*	.2004	.1770	.1995	.0225	.0009	
			b	.2001	.1771	.1995	.0224	.0006	
			c	.2006	.1764	.1990	.0226	.0016	
	1,000	3,000	*a*	.1992	.1766	.1990	.0224	.0002	
			b	.1997	.1768	.1992	.0224	.0005	
			c	.2013	.1764	.1989	.0225	.0024	
	2,000	5,000	*a*	.2003	.1768	.1993	.0225	.0010	
			b	.1999	.1768	.1993	.0225	.0006	
			c	.2009	.1760	.1987	.0227	.0022	
	662,500	667,500	.....	.....	.....	.....	.....	.....	Bar ruptured.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
30,000	0	0	*a*	.2004	.1783	.2002	.0219	.0002	
			b	.2007	.1781	.2004	.0223	.0003	
			c	.2005	.1779	.2001	.0222	.0004	
	1,000	1,000	*a*	.2001	.1777	.1999	.0222	.0002	
			b	.2008	.1774	.1998	.0224	.0010	
			c	.2007	.1778	.2001	.0223	.0006	
	1,000	2,000	*a*	.1997	.1771	.1995	.0224	.0002	
			b	.2016	.1770	.1996	.0226	.0020	
			c	.2008	.1776	.2001	.0225	.0007	
	1,000	3,000	*a*	.2010	.1778	.1998	.0225	.0012	
			b	.2007	.1768	.1994	.0226	.0013	
			c	.2010	.1776	.2000	.0224	.0010	
	2,000	5,000	*a*	.2014	.1774	.1998	.0224	.0016	
			b	.2010	.1764	.1993	.0229	.0017	
			c	.2010	.1776	.2002	.0226	.0008	
	895,900	900,900	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 67.—*Wrought-iron bar (Burden's). Mark*, 5.

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
30,000	0	0	*a*	.2000	.1775	.1998	.0223	.0002	
			b	.2003	.1777	.2001	.0224	.0002	
			c	.2001	.1776	.1998	.0222	.0003	
	1,000	1,000	*a*	.2001	.1772	.1996	.0224	.0005	
			b	.2005	.1779	.2000	.0221	.0005	
			c	.2002	.1771	.1995	.0224	.0007	
	1,000	2,000	*a*	.2006	.1768	.1993	.0225	.0013	
			b	.2004	.1777	.2000	.0223	.0004	
			c	.2001	.1768	.1992	.0224	.0009	
	1,000	3,000	*a*	.2006	.1770	.1992	.0222	.0014	
			b	.2004	.1777	.2000	.0223	.0004	
			c	.2005	.1768	.1992	.0224	.0013	
	2,000	5,000	*a*	.2006	.1765	.1991	.0226	.0015	
			b	.2005	.1776	.2000	.0224	.0005	
			c	.2005	.1766	.1990	.0224	.0015	
	5,000	10,000	*a*	.2000	.1762	.1988	.0226	.0012	
			b	.2007	.1775	.1999	.0224	.0008	
			c	.2007	.1763	.1989	.0226	.0018	
	90,000	100,000	*a*	.2014	.1759	.1984	.0225	.0030	
			b	.2005	.1769	.1993	.0224	.0012	
			c	.2010	.1761	.1985	.0224	.0025	
	96,000	196,000	*a*	.2022	.1753	.1983	.0230	.0039	
			b	.2011	.1766	.1992	.0226	.0019	
			c	.2011	.1756	.1985	.0229	.0026	
	100,000	296,000	*a*	.2024	.1751	.1981	.0230	.0043	
			b	.2010	.1766	.1991	.0236	.0019	
			c	.2012	.1757	.1985	.0228	.0027	
	104,000	400,000	*a*	.2018	.1748	.1979	.0231	.0039	
			b	.2005	.1761	.1989	.0228	.0016	
			c	.2014	.1755	.1984	.0229	.0030	

0	400,000	a	.2015	.1778	2003	.0225	.0012	
		b	.2005	.1778	.2001	.0223	.0004	
		c	.1995	.1763	.1986	.0223	.0009	
1,000	401,000	a	.1998	.1768	.1993	.0225	.0005	
		b	.2007	.1774	.1997	.0223	.0010	
		c	.2005	.1765	.1989	.0224	.0016	
1,000	402,000	a	.2009	.1766	.1994	.0228	.0015	
		b	.2008	.1772	.1997	.0225	.0011	
		c	.2004	.1763	.1988	.0225	.0016	
1,000	403,000	a	.1994	.1762	.1990	.0228	.0004	
		b	.2008	.1771	.1997	.0226	.0011	
		c	.2008	.1761	.1989	.0228	.0019	
								Bar heated in oil bath to 560° F. and kept at that temperature 1 hour. Cooled slowly in oil bath.
0	403,000	a	.2005	.1781	.2004	.0223	.0001	
		b	.2006	.1783	.2004	.0221	.0002	
		c	.1995	.1771	.1992	.0221	.0003	
1,000	404,000	a	.2006	.1779	.2003	.0224	.0003	
		b	.2006	.1781	.2004	.0223	.0002	
		c	.1996	.1769	.1993	.0224	.0003	
1,000	405,000	a	.2003	.1778	.2001	.0223	.0002	
		b	.2006	.1783	.2003	.0220	.0003	
		c	.1996	.1767	.1992	.0225	.0004	
1,000	406,000	a	.2008	.1776	.2001	.0225	.0007	
		b	.2006	.1779	.2004	.0225	.6002	
		c	.1997	.1769	.1993	.0224	.0004	
1,000	407,000	a	.2008	.1776	.2000	.0224	.0008	
		b	.2007	.1779	.2003	.0224	.0004	
		c	.1998	.1769	.1993	.0224	.0005	
1,000	408,000	a	.2001	.1774	.1999	.0225	.0002	
		b	.2007	.1779	.2003	.0224	.0004	
		c	.1998	.1767	.1993	.0226	.0005	
5,000	413,000	a	.1997	.1771	.1997	.0226	.0	
		b	.2006	.1778	.2001	.0223	.0005	
		c	.2000	.1766	.1991	.0225	.0009	
94,900	507,900	a	.2000	.1745	.1979	.0234	.0021	
		b	.2027	.1775	.2001	.0226	.0026	
		c	.2008	.1753	.1982	.0229	.0026	
28,300	536,200	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 68.—*Wrought-iron bar (Burden's). Mark, 5.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
30,000	0	0	*a*	.1999	.1775	.1997	.0222	.0002	
			b	.2003	.1778	.2000	.0222	.0003	
			c	.2005	.1779	.2002	.0223	.0003	
	1,000	1,000	*a*	.2004	.1768	.1993	.0225	.0011	
			b	.2006	.1776	.2000	.0224	.0005	
			c	.2007	.1775	.1999	.0224	.0008	
	1,000	2,000	*a*	.1995	.1765	.1989	.0224	.0006	
			b	.2004	.1775	.1999	.0224	.0005	
			c	.2009	.1774	.1998	.0224	.0011	
	1,000	3,000	*a*	.2005	.1767	.1990	.0223	.0015	
			b	.2004	.1776	.1999	.0223	.0005	
			c	.2008	.1775	.1998	.0223	.0010	
	2,000	5,000	*a*	.2011	.1765	.1989	.0224	.0022	
			b	.2006	.1776	.1999	.0223	.0007	
			c	.2008	.1773	.1997	.0224	.0011	
	5,000	10,000	*a*	.2001	.1762	.1986	.0224	.0015	
			b	.2008	.1775	.1998	.0223	.0010	
			c	.2009	.1771	.1996	.0225	.0013	
	90,000	100,000	*a*	.1990	.1755	.1980	.0225	.0019	
			b	.2004	.1767	.1991	.0224	.0013	
			c	.2015	.1768	.1982	.0214	.0033	
	96,000	196,000	*a*	.2016	.1759	.1985	.0226	.0031	
			b	.2011	.1768	.1993	.0225	.0018	
			c	.2011	.1768	.1993	.0225	.0018	
	100,000	296,000	*a*	.1983	.1752	.1978	.0228	.0005	
			b	.2013	.1766	.1991	.0228	.0022	
			c	.2014	.1767	.1993	.0226	.0021	

104,000	400,000	a	.1901	.1753	.1963	.0230	.0009			
		b	.2010	.1768	.1963	.0225	.0023			
		c	.2011	.1765	.1961	.0226	.0020			
								Rested 17 days.		
0	404,000	a	.2011	.1777	.2001	.0224	.0010			
		b	.2004	.1776	.2000	.0224	.0006			
		c	.1999	.1770	.1963	.0223	.0006			
1,000	401,000	a	.1994	.1765	.1963	.0227	.0002			
		b	.2010	.1776	.1999	.0223	.0011			
		c	.2007	.1771	.1996	.0225	.0011			
1,000	402,000	a	.2009	.1764	.1998	.0229	.0016			
		b	.2009	.1775	.1999	.0224	.0010			
		c	.2007	.1769	.1995	.0226	.0013			
1,000	403,000	a	.2008	.1764	.1992	.0228	.0016			
		b	.2006	.1773	.1998	.0225	.0008			
		c	.2009	.1771	.1995	.0224	.0014			
								Bar heated in oil bath to 500° F., and kept at that temperature 1 hour. Cooled slowly in oil bath.		
0	403,000	a	.1999	.1778	.1998	.0220	.0001			
		b	.2005	.1783	.2008	.0220	.0002			
		c	.2004	.1779	.2003	.0224	.0001			
1,000	404,000	a	.2001	.1771	.1998	.0227	.0003			
		b	.2005	.1783	.2003	.0221	.0002			
		c	.2005	.1781	.2002	.0221	.0003			
1,000	405,000	a	.1999	.1770	.1997	.0227	.0003			
		b	.2003	.1781	.2002	.0221	.0003			
		c	.2005	.1779	.2002	.0223	.0003			
1,000	406,000	a	.1999	.1770	.1997	.0227	.0003			
		b	.2006	.1780	.2003	.0223	.0004			
		c	.2005	.1778	.2002	.0224	.0003			
1,000	407,000	a	.2002	.1769	.1997	.0228	.0005			
		b	.2006	.1780	.2003	.0223	.0004			
		c	.2006	.1778	.2001	.0223	.0005			
1,000	408,000	a	.1998	.1768	.1995	.0227	.0001			
		b	.2005	.1778	.2002	.0224	.0003			
		c	.2006	.1777	.2001	.0224	.0005			
5,000	413,000	a	.2006	.1765	.1995	.9290	.0011			
		b	.2004	.1776	.2000	.0224	.0006			
		c	.2007	.1775	.2000	.0225	.0007			
								Bar ruptured.		
49,400	453,400									

TEST No. 69.—*Wrought-iron shaft from rod No. 5.*

Diameter, 1.″; speed of rotation, 2,200 per minute; length between end bearings, 33″.
Tested under 30,000 pounds per square inch maximum fiber stress.
A stream of cold water played on shaft during the test.
Rupture occurred at 556,400 rotations.

No. 78.—*Wrought-iron bar (Burden's). Mark, 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10′.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2014	.1708	.2010	.0302	.0004	
			b	.2015	.1707	.2008	.0301	.0007	
			c	.2016	.1708	.2009	.0301	.0007	
	1,000	1,000	*a*	.1978	.1624	.1934	.0310	.0044	Stream of cold water played on bar continually during the test.
			b	.1999	.1618	.1932	.0314	.0067	
			c	.2109	.1634	.1945	.0311	.0164	
	1,000	2,000	*a*	.1995	.1599	.1912	.0313	.0083	
			b	.1999	.1592	.1908	.0316	.0091	
			c	.2136	.1625	.1936	.0311	.0200	
	1,000	3,000	*a*	.2014	.1609	.1924	.0315	.0090	
			b	.2126	.1626	.1937	.0311	.0189	
			c	.2073	.1610	.1922	.0312	.0151	
	67,100	70,100	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 79.—*Wrought-iron bar (Burden's). Mark, 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2003	.1703	.1999	.0296	.0004	
			b	.2002	.1698	.1996	.0298	.0006	
			c	.2004	.1697	.1998	.0301	.0006	
									Stream of cold water played on bar continually during the test.
	1,000	1,000	*a*	.1924	.1594	.1905	.0311	.0019	
			b	.2063	.1636	.1945	.0309	.0118	
			c	.2064	.1646	.1954	.0308	.0110	
	1,000	2,000	*a*	.2115	.1618	.1926	.0308	.0189	
			b	.2056	.1618	.1928	.0310	.0128	
			c	.2062	.1646	.1935	.0309	.0127	
	1,000	3,000	*a*	.2068	.1633	.1941	.0308	.0127	
			b	.2004	.1616	.1928	.0312	.0076	
			c	.2062	.1634	.1943	.0309	.0119	
	74,300	77,300	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 80.—*Wrought-iron shaft from rod No. 6.*

The shaft was initially heated and maintained at about 200° F. during the test by means of a gas burner, the heat of the shaft itself not being sufficient to maintain the above temperature while running.

The shaft made 56,600 rotations the first day of the test, it then cooled, but was reheated the following morning before resuming the test.

Rupture occurred at 129,600 rotations.

No. 80.—*Wrought-iron bar (Burden's). Mark, 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2014	.1710	.2010	.0300	.0004	
			b	.2014	.1709	.2010	.0301	.0004	
			c	.2014	.1707	.2009	.0302	.0005	
									Bar heated to about 200° F. by means of gas burners, and this temperature maintained during the test.
	0	0	*a*	.2005	.1672	.2000	.0328	.0005	
			b	.2008	.1688	.2005	.0317	.0003	
			c	.2009	.1693	.2005	.0312	.0004	
	1,000	1,000	*a*	.2000	.1681	.1996	.0315	.0004	
			b	.1979	.1660	.1972	.0312	.0007	
			c	.2053	.1712	.2022	.0310	.0031	
	1,000	2,000	*a*	.2039	.1695	.2014	.0319	.0025	
			b	.2020	.1693	.2006	.0313	.0014	
			c	.2004	.1678	.1989	.0311	.0015	
	1,000	3,000	*a*	.2019	.1690	.2006	.0316	.0013	
			b	.1984	.1665	.1976	.0311	.0008	
			c	.2089	.1701	.2011	.0310	.0028	
	126,600	129,600	.....	.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 81.—*Wrought-iron shaft from rod No. 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″.

Tested under 40,000 pounds per square inch maximum fiber stress.

The shaft was initially heated, and temperature maintained at about 210° F. by means of a gas burner. The shaft made 42,600 rotations at the close of the first day.

It was reheated the following morning and the test resumed, and had completed 129,300 rotations at noon of the second day, when it cooled and rested without load one hour. It was again reheated and the test resumed.

Rupture occurred at 176,100 rotations.

The shaft was badly scored at the middle bearing during the test.

No. 82.—*Wrought-iron bar (Burden's). Mark, 6.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2007	.1703	.2004	.0301	.0003	
			b	.2009	.1701	.2004	.0303	.0005	
			c	.2008	.1700	.2002	.0302	.0006	
									Stream of cold water played on bar continually during the test.
	1,000	1,000	*a*	.1992	.1626	.1936	.0310	.0056	
			b	.2092	.1638	.1949	.0311	.0143	
			c	.2053	.1643	.1950	.0307	.0103	
	1,000	2,000	*a*	.1927	.1563	.1897	.0314	.0030	
			b	.2113	.1616	.1933	.0317	.0180	
			c	.2084	.1631	.1941	.0310	.0143	
	1,000	3,000	*a*	.1898	.1559	.1874	.0315	.0024	
			b	.2106	.1615	.1929	.0314	.0177	
			c	.2099	.1626	.1938	.0312	.0161	
	64,300	67,300		.....	.....	.....	.....	.....	Bar ruptured.

TEST NO. 91.—*Wrought-iron shaft from rod No. 6a.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″.

The shaft was initially heated to the estimated temperature of 450° F. and then loaded with 40,000 pounds per square inch maximum fiber stress.

The shaft gradually deflected and would not sustain the load.

The shaft was cooled, rested 16 hours, and again heated to the above temperature, and straightened at this heat.

After straightening the temperature was increased to about 700° F., then loaded with 30,000 pounds per square inch maximum fiber stress, and rotations began.

When 54,000 rotations had been made the test was interrupted for about 1 minute; upon resuming the test there was violent wabbling, whereas before the interruption the shaft had run smoothly with constant deflection.

The vibrations which had set in continued for about 800 rotations, when their amplitude was partially checked by restricting the downward movements of the weighted lever, whereupon the tendency to wabble immediately ceased, and with the lever released the shaft run smoothly until ruptured, which occurred at 209,000 rotations.

TEST NO. 93.—*Wrought-iron shaft from rod No. 6a.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″.

Maximum fiber stress, 35,000 pounds per square inch.

Initially heated. Approximate temperature of test, 500° F. for 30,000 rotations, then the shaft was cooled with water and the test completed cold.

The shaft run smoothly without wabbling motion throughout the test.

Ruptured at 187,800 rotations, the position of rupture being ″.75 from the middle bearing.

TEST NO. 94.—*Wrought-iron shaft from rod No. 6a.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″.

Maximum fiber stress, 35,000 pounds per square inch.

Initially heated. Approximate temperature of test, 550 F.

Shaft ruptured at 28,800 rotations.

TEST NO. 95.—*Wrought-iron shaft from rod No. 6a.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″.

Maximum fiber stress, 35,000 pounds per square inch.

Initially heated. Approximate temperature, 500° F. for 29,100 rotations; then the shaft was cooled with water and the test completed cold.

Ruptured at 158,400 rotations.

TEST NO. 92.—*Wrought-iron shaft from rod No. 7.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″.

Maximum fiber stress, 35,000 pounds per square inch.

When 42,000 rotations had been made there occurred violent wabbling of the shaft, which was arrested by momentarily checking the vibrations of the weighted lever, after which the shaft run smoothly for the remainder of the test.

Ruptured at 60,700 rotations.

TEST NO. 107.—*Wrought-iron shaft from rod No. 7.*

Diameter, 1″. Speed of rotation 2,200 per minute. Length between end bearings, 33″.

Maximum fibre stress, 40,000 pounds per square inch.

Initially heated to about 600° F. by means of gas burner.

When rotations began the gas was shut off, but owing to the high speed of rotation and the maximum fiber stress the temperature of the shaft remained at about the initial temperature.

At 106,000 rotations the shaft rested one hour without load, and was allowed to cool in the meantime.

The shaft was reheated to the initial temperature after resting and the test completed.

Ruptured at 107,000 rotations.

TEST NO. 100.—*Wrought-iron shaft from rod No. 8.*

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″.

Maximum fiber stress, 40,000 pounds per square inch.

A stream of water played on shaft during the test.

Ruptured at 39,200 rotations.

TEST No. 101.—*Wrought-iron shaft from rod No.* 8.

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″.
Maximum fiber stress, 40,000 pounds per square inch.
Maximum temperature of the test, about 450 F., which was acquired during running. The test began cold.
Ruptured at 66,200 rotations.

TEST No. 102.—*Wrought-iron shaft from rod No.* 8.

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″.
Maximum fiber stress, 40,000 pounds per square inch.
Maximum temperature of the test, about 550 F., which was acquired during running. The test began cold.
Ruptured at 138,200 rotations.

TEST No. 108.—*Wrought-iron shaft from rod No.* 8.

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″.
Maximum fiber stress, 45,000 pounds per square inch.
Initially heated and tested at 600° F.
Shaft ruptured at 56,800 rotations.

TEST No. 109.—*Wrought-iron shaft from rod No.* 8.

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″.
Maximum fiber stress, 45,000 pounds per square inch.
A stream of cold water was played on the shaft during the test.
Shaft ruptured at 16,500 rotations.

No. 96.—*Wrought-iron bar No. 9.*

Diameter, 1″. Speed of rotation, 22,000 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
10,000	25,200	25,200							
15,000	0	25,200	a	.2000	.1892	.2000	.0108	0.	
			b	.1999	.1889	.1998	.0109	.0001	
			c	.1998	.1888	.1997	.0110	.0001	
	19,950	45,150	a	.2002	.1891	.2001	.0110	.0001	
			b	.1999	.1888	.1997	.0109	.0002	
			c	.1998	.1887	.1997	.0110	.0001	
20,000	0	45,150	a	.2002	.1851	.2001	.0150	.0001	
			b	.1999	.1849	.1998	.0149	.0001	
			c	.1998	.1849	.1997	.0148	.0001	
	20,050	65,200	a	.2001	.1851	.2001	.0150	0.	
			b	.1999	.1849	.1999	.0150	0.	
			c	.1998	.1849	.1997	.0148	.0001	
25,000	0	65,200	a	.2003	.1816	.2001	.0185	.0002	
			b	.1999	.1811	.1998	.0187	.0001	
			c	.1999	.1809	.1997	.0188	.0002	
	19,900	85,100	a	.2004	.1814	.2002	.0188	.0002	
			b	.1999	.1813	.1997	.0185	.0002	
			c	.1999	.1810	.1997	.0187	.0002	
30,000	0	85,100	a	.2002	.1776	.1999	.0223	.0003	
			b	.2001	.1773	.1999	.0226	.0002	
			c	.2000	.1772	.1996	.0224	.0004	
	20,000	105,100	a	.1997	.1760	.1996	.0236	.0001	
			b	.2005	.1771	.1995	.0224	.0010	
			c	.2006	.1767	.1992	.0225	.0014	
	20,000	125,100	a	.1991	.1764	.1989	.0225	.0002	
			b	.2019	.1771	.1996	.0225	.0014	

25,000	0	145,000	*a*	.2009	.1719	.1982	.0263	.0027	
			b	.2012	.1732	.1992	.0260	.0020	
			c	.2007	.1725	.1988	.0263	.0019	
	20,000	165,000	*a*	.1930	.1663	.1931	.0268	−.0001	Temperature of bar about 200° F.
			b	.2060	.1759	.2021	.0262	.0039	
			c	.2019	.1733	.1998	.0265	.0021	
	20,000	185,000	*a*	.2044	.1738	.2005	.0267	.0039	Temperature about 200° F.
			b	.2001	.1721	.1988	.0267	.0018	
			c	.1992	.1710	.1977	.0267	.0015	
	20,000	205,000	*a*	.2014	.1730	.1998	.0268	.0016	Temperature about 200° F.
			b	.1956	.1680	.1946	.0266	.0010	
			c	.2043	.1749	.2013	.0264	.0030	
	20,100	225,100	*a*	.2082	.1734	.2007	.0278	.0025	Temperature about 200° F.
			b	.2009	.1721	.1990	.0269	.0019	
			c	1989	.1707	.1974	.0267	.0015	
	19,900	245,000	*a*	.1965	.1694	.1962	.0268	.0003	Temperature about 200° F.
			b	.1974	.1694	.1964	.0270	.0010	
			c	.2063	.1750	.2012	.0262	.0051	
	13,000	258,000	.....	.....	.....	.....	.....	.....	Bar ruptured. Temperature at the time about 200° F.

No. 97.—*Wrought-iron bar No. 9.*

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″. Estimated maximum temperature acquired during the test, 550° F.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2003	.1704	.2000	.0296	.0003	
			b	.2005	.1701	.2000	.0299	.0005	
			c	.1998	.1698	.1994	.0296	.0004	
	10,000	10,000							Temperature of bar increased rapidly.
			a	.2002	.1672	.1976	.0304	.0026	
			b	.1996	.1676	.1978	.0302	.0018	
			c	.2034	.1702	.2001	.0299	.0033	
	24,250	34,250	.....	.....	.....	.....	.....	.....	Pin in driving-head broke; the test then discontinued. The bar reached a temperature sufficient to color it dark straw brownish tint, and directly under the bronze ring (at the middle) the bar was colored blue, a bright light-colored tint.
	126,750	161,000	.....	.....	.....	.....	.....	.....	Bar ruptured.

No. 98.— *Wrought-iron bar No. 8.*

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.1998	.1698	.1995	.0297	.0003	
			b	.2002	.1697	.1997	.0300	.0005	
			c	.2003	.1701	.1999	.0298	.0004	
	40,000	40,000	.....	.....	.....	.....	.....	.....	Bar ruptured. Water was played on bar by hand hose during the test. Temperature of bar remained unchanged.

No. 99.— *Wrought-iron bar No. 9.*

Diameter, 1″. Speed of rotation, 2,200 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
40,000	0	0	*a*	.2005	.1708	.2002	.0294	.0003	
			b	.2009	.1706	.2004	.0298	.0005	
			c	.2008	.1706	.2004	.0298	.0004	
	34,700	34,700	.....	.....	.....	.....	.....	.....	Bar ruptured. Water was played on shaft during the test.

No. 30.—*Cast Gun Iron. Mark 4.*

Diameter, 1″. Speed of rotation, 400 per minute. Length between end bearings, 33″. Deflections measured on chord of 10″.

Maximum fiber stress per square inch.	Number of rotations.		Micrometer readings for deflections.				Deflections.	Sets.	Remarks.
	Successive.	Total.	On line.	Unloaded.	Loaded.	Unloaded.			
Pounds.				*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
15,000	.....	10,746,000	.....	.....	.....	.....	.0191	.0008	Total run as per report of tests, 1889.
	2,039,500	12,785,500	*a*	.1986	.1796	.1985	.0189	.0001	
			b	.1991	.1794	.1985	.0191	.0006	
			c	.1987	.1790	.1979	.0189	.0008	
	1,924,600	14,710,100	*a*	.1987	.1798	.1986	.0188	.0001	
			b	.1994	.1799	.1988	.0189	.0006	
			c	.1990	.1789	.1982	.0193	.0008	
	2,082,900	16,793,000	*a*	.1995	.1797	.1987	.0190	.0008	
			b	.1994	.1798	.1988	.0190	.0006	
			c	.1989	.1792	.1982	.0190	.0007	
	1,984,700	18,777,700	*a*	.1994	.1798	.1990	.0192	.0004	
			b	.1995	.1802	.1991	.0189	.0004	
			c	.1993	.1794	.1985	.0191	.0008	
	1,929,600	20,707,300	*a*	.1992	.1802	.1990	.0188	.0002	
			b	.1999	.1803	.1991	.0188	.0008	
			c	.1993	.1794	.1986	.0192	.0007	
	1,859,900	22,567,200	*a*	.1995	.1805	.1991	.0186	.0004	
			b	.1999	.1805	.1992	.0187	.0007	
			c	.1993	.1797	.1987	.0190	.0006	
	2,163,800	24,731,000	*a*	.1998	.1803	.1991	.0188	.0007	
			b	.1998	.1802	.1998	.0191	.0005	
			c	.1995	.1797	.1986	.0189	.0009	
	1,946,000	26,677,000	*a*	.2001	.1804	.1994	.0190	.0007	
			b	.1999	.1801	.1993	.0192	.0006	
			c	.1994	.1798	.1988	.0190	.0006	
	1,964,200	28,641,200	*a*	.2000	.1800	.1992	.0192	.0008	
			b	.1997	.1802	.1992	.0192	.0005	
			c	.1993	.1795	.1985	.0190	.0008	

2,130,800	30,781,000	a	.1906	.1803	.1953	.0190	.0043		
		b	.2001	.1803	.1986	.0190	.0008		
		c	.1904	.1798	.1957	.0189	.0007		
1,946,000	32,727,000	a	.1898	.1804	.1993	.0189	.0005		
		b	.1998	.1801	.1993	.0192	.0005		
		c	.1896	.1796	.1986	.0192	.0006		
1,961,000	34,688,000	a	.1907	.1805	.1994	.0189	.0003		
		b	.2000	.1805	.1994	.0189	.0006		
		c	.1906	.1797	.1989	.0192	.0007		
1,832,150	36,520,750	a	.2008	.1817	.2006	.0189	.0003		
		b	.2012	.1816	.2005	.0189	.0007		
		c	.2010	.1810	.2000	.0190	.0016		
536,250	37,056,100	a	.2016	.1818	.2007	.0189	.0009		
		b	.2013	.1819	.2007	.0188	.0006		
		c	.2008	.1812	.2001	.0189	.0007		
95,800	37,151,900							Bar removed from machine not ruptured.	

ENDURANCE TESTS OF ROTATING SHAFTS.

GENERAL TABULATION OF RESULTS.

No. of test.	Material.	Marks.	Speed of rotation per minute.	Maximum fiber stress per square inch.	Number of rotations.		Remarks.
					Successive.	Total.	
				Pounds.			
31	O. H. steel.....	1	400	20,000	10,000	10,000	
				21,000	10,000	20,000	
				22,000	10,000	30,000	
				23,000	10,000	40,000	
				24,000	10,000	50,000	
				25,000	10,000	60,000	
				26,000	10,000	70,000	
				27,000	10,000	80,000	
				28,000	10,000	90,000	
				29,000	10,000	100,000	
				30,000	10,000	110,000	
				31,000	10,000	120,000	
				32,000	10,000	130,000	
				33,000	10,000	140,000	
				34,000	10,000	150,000	
				35,000	10,000	160,000	
				36,000	10,000	170,000	
				37,000	10,000	180,000	
				38,000	10,000	190,000	
				39,000	10,000	200,000	
				40,000	10,000	210,000	
				41,000	10,000	220,000	
				42,000	10,000	230,000	
				43,000	10,000	240,000	
				44,000	10,000	250,000	
				45,000	10,000	260,000	

50	....do	2	400	50,000	15,600	15,600	Bar ruptured.
51	....do	2	400	50,000	19,500	19,500	Bar ruptured. Annealed at 500° F. after 13,000 rotations.
52	....do	2	400	50,000	27,850	27,850	Bar ruptured. Annealed twice at 500° F. after 13,000 and 23,000 rotations, respectively.
53	....do	2	400	50,000	43,300	43,300	Bar ruptured. Annealed six times at 500° F., at intervals of 5,000 rotations.
54	....do	2	400	50,000	44,900	44,900	Bar ruptured. Annealed six times at 500° F., at intervals of 5,000 rotations.
55	....do	3	400	45,000	127,500	127,500	Bar ruptured.
56	....do	3	400	45,000	116,900	116,900	Bar ruptured. Annealed six times at 500° F., at intervals of 10,000 rotations, between 13,000 and 63,000 rotations.
57	....do	3	400	45,000	131,000	131,000	Bar ruptured. Annealed six times at 500° F., at intervals of 10,000 rotations, between 13,000 and 63,000 rotations.
58	....do	3	400	45,000	94,700	94,700	Bar ruptured. Annealed six times at 500° F., at intervals of 5,000 rotations. Final annealing at 33,000 rotations.
59	....do	3	400	45,000	79,850	79,850	Bar ruptured. Annealed six times at 500° F., at intervals of 5,000 rotations. Final annealing at 33,000 rotations.
70	....do	4	400	45,000	52,900	52,900	Bar ruptured.
71	....do	4	400	45,000	70,750	70,750	Bar ruptured. Stream of cold water played on specimen during the test.
72	....do	4	400	45,000	50,450	50,450	Bar ruptured. Temperature during test ranged from 120° to 180° F.
73	....do	4	400	45,000	58,100	58,100	Bar ruptured. Stream of cold water played on specimen during the test.
103	....do	4 a	2,200	45,000	46,200	46,200	Bar ruptured. Temperature reached about 500° F. at close of test.
104	....do	4 a	2,200	45,000	58,000	58,000	Bar ruptured. Stream of water played on specimen during the test.
105	....do	4 a	2,200	45,000	54,000	54,000	Do.
106	....do	4 a	2,200	45,000	57,000	57,000	Bar ruptured. Initially heated to the temperature of about 600° F.
74	....do	5	400	45,000	2,000	2,000	
				48,000	50,800	53,800	Bar ruptured. Stream of cold water played on specimen during the test.
75	....do	5	400	48,000	32,850	32,850	Bar ruptured. Initially heated. Temperature of test about 180° F.
76	....do	5	400	48,000	31,650	31,650	Bar ruptured. Initially heated. Temperature of test about 290° F.
77	....do	5	400	48,000	55,900	55,900	Bar ruptured. Stream of cold water played on specimen during the test.
83	....do	6	400	45,000	60,550	60,550	Bar ruptured. Shaft gradually increased in temperature, reaching about 150° F. at close of test.
84	....do	6	400	45,000	87,550	87,550	Bar ruptured. Hot test. Maximum temperature, 432° F.
85	....do	6	400	45,000	61,800	61,800	Bar ruptured. Hot test. Maximum temperature, 395° F.
86	....do	6	400	45,000	58,550	58,550	Bar ruptured. Run hot for 30,000 rotations, maximum temperature 402° F., then cooled with water; 150° F. at close of test.
87	....do	7	400	45,000	108,250	108,250	Bar ruptured. Run hot for 30,000 rotations, maximum temperature 468° F., then cooled with water; 150° F. at close of test.
88	....do	7	400	45,000	95,400	95,400	Bar ruptured. Hot test. Maximum temperature, 425° F.
89	....do	7	400	45,000	117,900	117,900	Bar ruptured. Tested at 700° F. during 11,400 rotations, then run cold, 65° F., for remainder of test.
90	....do	7	400	45,000	140,350	140,350	Bar ruptured. Tested at 700° F. during 17,600 rotations, then run cold, 65° F., for remainder of test.
111	....do	15	2,200	20,000	3,700	3,700	
				30,000	36,300	40,000	
				40,000	20,050	60,050	
				50,000	99,950	160,000	Test discontinued.

ENDURANCE TESTS OF ROTATING SHAFTS—Continued.

GENERAL TABULATION OF RESULTS—Continued.

No. of test.	Material.	Marks.	Speed of rotation per minute.	Maximum fiber stress per square inch.	Number of rotations.		Remarks.
					Successive.	Total.	
				Pounds.			
110	O. H. steel	21	2,200	20,000	4,000	4,000	
				30,000	2,750	6,750	
				40,000	5,450	12,200	
				50,000	68,800	81,000	Bar ruptured.
41	Wrought iron	1	400	25,000	5,000	5,000	
				26,000	5,000	10,000	
				27,000	5,000	15,000	
				28,000	5,000	20,000	
				29,000	5,000	25,000	
				30,000	5,000	30,000	
				31,000	5,000	35,000	
				32,000	5,000	40,000	
				33,000	5,000	45,000	
				34,000	5,000	50,000	
				35,000	5,000	55,000	
				36,000	5,000	60,000	
				37,000	5,000	65,000	
				38,000	5,000	70,000	
				39,000	5,000	75,000	
				40,000	5,000	80,000	
				41,000	5,000	85,000	
				42,000	5,000	90,000	
				43,000	5,000	95,000	
				44,000	5,000	100,000	
				45,000	5,000	105,000	
				46,000	5,000	110,000	
				47,000	1,500	111,500	Bar ruptured.
42	Wrought iron	1	400	40,000	41,050	41,050	Bar ruptured.
43	....do	1	400	40,000	86,200	86,200	Bar ruptured. Annealed eight times at 420° to 425° F., at intervals of 10,000 rotations.
44	....do	1	400	40,000	110,000	110,000	Bar ruptured. Annealed five times at 415° to 425° F., at intervals of 20,000 rotations.
45	....do	2	400	40,000	53,950	53,950	Bar ruptured.
46	....do	2	400	40,000	46,800	46,800	Bar ruptured.
47	....do	2	400	40,000	91,750	91,750	Bar ruptured; annealed seven times at 425° F., at intervals of 10,000 rotations.
48	....do	2	400	40,000	57,500	57,500	Bar ruptured; annealed twice at 425° F., at intervals of 20,000 rotations.
49	....do	2	400	40,000	48,100	48,100	Bar ruptured; annealed once at 425° F., after 30,000 rotations.

36	....do	3	400	20,000	5,000	5,000	
				21,000	5,000	10,000	
				22,000	5,000	15,000	
				23,000	5,000	20,000	
				24,000	5,000	25,000	
				25,000	5,000	30,000	
				26,000	5,000	35,000	
				27,000	5,000	40,000	
				28,000	5,000	45,000	
				29,000	5,000	50,000	
				30,000	5,000	55,000	
				31,000	5,000	60,000	
				32,000	5,000	65,000	
				33,000	5,000	70,000	
				34,000	5,000	75,000	
				35,000	5,000	80,000	
				36,000	5,000	85,000	
				37,000	5,000	90,000	
				38,000	6,000	96,000	
				39,000	4,000	100,000	
				40,000	5,000	105,000	
				41,000	5,000	110,000	
				42,000	5,000	115,000	
				43,000	5,000	120,000	
				44,000	5,000	125,000	
				45,000	4,500	129,500	Bar ruptured.
37	Wrought iron	3	400	40,000	43,300	43,300	Do.
38	....do	3	400	40,000	37,200	37,200	Do.
39	....do	3	400	40,000	51,500	51,500	Bar ruptured; annealed at 599° F., after 31,000 rotations.
40	....do	3	400	40,000	39,400	39,400	Bar ruptured; annealed at 598° F., after 20,000 rotations.
60	....do	4	400	35,000	152,850	152,850	Bar ruptured.
61	....do	4	400	35,000	185,500	185,500	Bar ruptured; annealed six times at 500° F., at intervals of 20,000 rotations.
62	....do	4	400	35,000	145,850	145,850	Do.
63	....do	4	400	35,000	201,300	201,300	Bar ruptured; annealed four times at 500° F., at intervals of 40,000 rotations.
64	....do	4	400	35,000	191,600	191,600	Do.
65	....do	5	400	30,000	667,500	667,500	Bar ruptured.
66	....do	5	400	30,000	900,900	900,900	Do.
67	....do	5	400	30,000	536,200	536,200	Bar ruptured; annealed at 500° F., after 403,000 rotations.
68	....do	5	400	30,000	462,400	462,400	Do.
69	....do	5	2,200	30,000	556,400	556,400	Bar ruptured; stream of cold water played on specimen during the test.
78	....do	6	400	40,000	70,100	70,100	Do.
79	....do	6	400	40,000	77,300	77,300	Do.
80	....do	6	400	40,000	129,600	129,600	Bar ruptured; tested at 200° F.; temperature maintained with gas-burner.
81	....do	6	400	40,000	176,100	176,100	Bar ruptured; tested at 210° F.; temperature maintained with gas-burner.
82	....do	6	400	40,000	67,300	67,300	Bar ruptured; stream of cold water played on shaft during the test.
91	....do	6a	400	30,000	209,000	209,000	Bar ruptured; tested at 700° F.
93	....do	6a	400	35,000	187,800	187,800	Bar ruptured; tested at 500° F. for 30,000 rotations; completed cold.
94	....do	6a	400	35,000	28,800	28,800	Bar ruptured; tested at 550° F.

ENDURANCE TESTS OF ROTATING SHAFTS—Continued.

GENERAL TABULATION OF RESULTS—Continued.

No. of test.	Material.	Marks.	Speed of rotation per minute.	Maximum fiber stress per square inch.	Number of rotations.		Remarks.
					Successive.	Total.	
				Pounds.			
95	Wrought iron	6a	400	35,000	158,400	158,400	Bar ruptured; tested at 500° F. for 29,100 rotations; completed cold.
92	....do	7	400	35,000	60,700	60,700	Bar ruptured; tested at 550° F.
107	....do	7	2,200	40,000	107,000	107,000	Bar ruptured; tested at 600° F.
100	....do	8	2,200	40,000	39,200	39,200	Bar ruptured; tested cold; a stream of cold water played on shaft during the test.
101	....do	8	2,200	40,000	66,200	66,200	Bar ruptured; tested at 450° F., the maximum temperature acquired during the test.
102	....do	8	2,200	40,000	138,200	138,200	Bar ruptured; tested at 550° F., the maximum temperature acquired during the test.
108	....do	8	2,200	45,000	56,800	56,800	Bar ruptured; tested at 600° F.; initially heated.
109	....do	8	2,200	45,000	16,500	16,500	Bar ruptured; tested cold; a stream of water played on shaft during the test.
96	....do	9	2,200	15,000	45,150	45,150	
				20,000	20,050	65,200	
				25,000	19,900	85,100	
				30,000	59,900	145,000	
				35,000	113,000	258,000	Bar ruptured.
97	....do	9	2,200	40,000	161,000	161,000	Bar ruptured; test began cold; estimated temperature acquired during the test, 550° F.
98	....do	9	2,200	40,000	40,000	40,000	Bar ruptured; tested cold; a stream of water played on shaft during the test.
99	....do	9	2,200	40,000	34,700	34,700	Do.
90	Cast (gun) iron	4	400	15,000	37,151,900	37,151,900	Bar removed from machine; not ruptured.

TENSILE TESTS OF SPECIMENS FROM BARS RUPTURED BY ENDURANCE TESTS OF ROTATING SHAFTS.

These specimens were taken from the outer ends of the shafts, next the bearing opposite the driving head.

The marks given are the numbers of the endurance tests.

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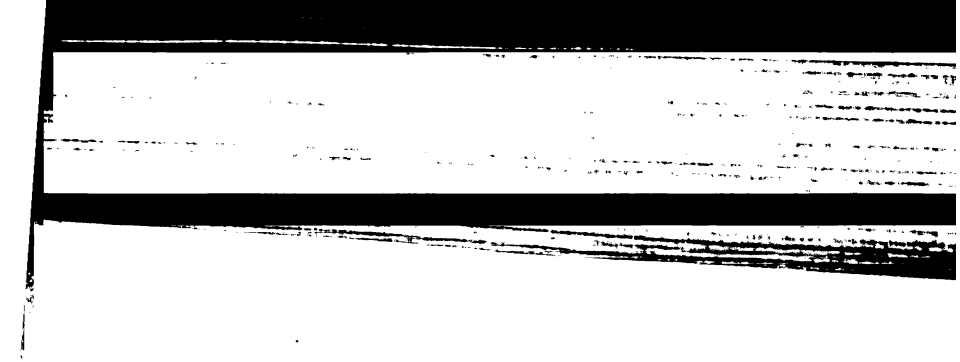


SPECIMENS FROM STEEL SHAFTS.

No. 4230.

Mark, 31.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0007	0.	
2,500	10,000	.0017	.....	
3,750	15,000	.0027	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	0.	
8,750	35,000	.0067	.....	
10,000	40,000	.0079	.....	
11,250	45,000	.0088	.....	
12,500	50,000	.0100	.....	
12,750	51,000	.0102	.....	
13,000	52,000	.0104	.....	
13,250	53,000	.0106	.....	
13,500	54,000	.0108	.....	
13,750	55,000	.0109	.....	
14,000	56,000	.0112	.....	
14,250	57,000	.0114	.....	
14,500	58,000	.0117	.....	Elastic limit. Load fell.
12,000	48,000	.0650	.....	
		.1700	.....	
12,250	49,000	.1733	.....	
12,500	50,000	.1785	.....	
13,000	52,000	.2100	.....	
13,500	54,000	.2540	.....	
14,000	56,000	.3060	.....	
14,500	58,000	.38	.....	
15,000	60,000	.48	.....	
15,300	62,000	.65	.....	
15,880	63,520	1.11	.....	Tensile strength.
0	0	1.60	.....	=26.7 per cent.

Elongation of inch sections, ″.15, ″.20, ″.28, ″.56*, ″.24, ″.17.
Fractured 3″.5 from the neck. Appearance, fine silky.
Diameter at fracture, ″.32. Area, .0804 square inch.
Contraction, 67.8 per cent.

No. 4231.

Mark, 32.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	.....	
8,750	35,000	.0068	.....	
10,000	40,000	.0079	—.0001	
11,250	45,000	.0088	.....	
12,500	50,000	.0098	—.0001	
12,750	51,000	.0099	.....	Elastic limit. Load fell.
11,500	46,000	.0508	.....	
11,750	47,000	.0598	.....	
12,000	48,000	.1605	.....	
12,250	49,000	.1646	.....	
12,500	50,000	.1778	.....	
12,750	51,000	.1921	.....	
13,000	52,000	.2190	.....	
13,500	54,000	.2730	.....	
14,000	56,000	.3175	.....	
14,500	58,000	.4050	.....	
15,000	60,000	.53	.....	
15,500	62,000	.73	.....	
15,730	62,920	1.16	.....	Tensile strength.
0	0	1.60	.....	=26.7 per cent.

Elongation of inch sections, ″.16, ″.21, ″.28, ″.57*, ″.22, ″.16.
Fractured 3″.4 from the neck. Appearance, fine silky.
Diameter at fracture, ″.32. Area, .0804 square inch.
Contraction, 67.8 per cent.

No. 4232.

Mark, 33.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0009	.....	
2,500	10,000	.0019	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0039	.....	
6,250	25,000	.0049	.....	
7,500	30,000	.0060	.....	
8,750	35,000	.0070	.....	
10,000	40,000	.0080	.0001	
11,250	45,000	.0091	.....	
11,500	46,000	.0093	.....	
11,750	47,000	.0095	.....	
12,000	48,000	.0097	.....	
12,250	49,000	.0099	.....	
12,500	50,000	.0101	.....	
12,750	51,000	.0103	.....	
13,000	52,000	.0105	.....	
13,250	53,000	.0107	.....	Elastic limit. Load fell.
11,500	46,000	.0400	.....	
11,750	47,000	.1565	.....	
12,000	48,000	.1640	.....	
12,250	49,000	.1725	.....	
12,500	50,000	.1920	.....	
12,750	51,000	.2100	.....	
13,000	52,000	.2300	.....	
13,250	53,000	.2500	.....	
13,500	54,000	.2870	.....	
13,750	55,000	.32	.....	
14,000	56,000	.36	.....	
14,250	57,000	.39	.....	
14,500	58,000	.42	.....	
15,000	60,000	.58	.....	
15,500	62,000	.82	.....	
15,700	62,800	.....	.....	Tensile strength.
0	0	1.57	.....	=26.2 per cent.

Elongation of inch sections, ″.16, ″.20, ″.26, ″.56*, ″.22, ″.17.
Fractured 3″.25 from the neck. Appearance, fine silky.
Diameter at fracture, ″.31. Area, .0754 square inch.
Contraction, 69.8 per cent.

No. 4233.

Mark, 34.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	.....	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0017	.....	
3,750	15,000	.0027	.....	
5,000	20,000	.0036	.....	
6,250	25,000	.0046	.....	
7,500	30,000	.0057	.....	
8,750	35,000	.0067	.....	
10,000	40,000	.0077	0.	
11,250	45,000	.0087	.....	
12,000	48,000	.0097	.....	
12,250	49,000	.0098	.....	
12,500	50,000	.0100	.....	
12,750	51,000	.0101	.....	
13,000	52,000	.0102	.....	Elastic limit. Load fell.
11,500	46,000	.0185	.....	
11,000	44,000	.0924	.....	
11,250	45,000	.1000	.....	
11,500	46,000	.1300	.....	
11,750	47,000	.1500	.....	
12,000	48,000	.1640	.....	
12,250	49,000	.1765	.....	
12,500	50,000	.1917	.....	
12,750	51,000	.2120	.....	
13,000	52,000	.2340	.....	
13,250	53,000	.2555	.....	
13,500	54,000	.2870	.....	
13,750	55,000	.31	.....	
14,000	56,000	.36	.....	
14,500	58,000	.46	.....	
15,000	60,000	.58	.....	
15,500	62,000	.86	.....	
15,580	62,320	1.18	.....	Tensile strength.
0	0	1.60	.....	=26.7 per cent.

Elongation of inch sections, ″.16, ″.24, ″.57*, ″.23, ″.21, ″.19.
Fractured 3″.1 from the neck. Appearance, fine silky.
Diameter at fracture, ″.31. Area, .0754 square inch.
Contraction, 69.8 per cent.

No. 4213.

Marks, 50.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0011	0.	
2,500	10,000	.0022	.....	
3,750	15,000	.0032	0.	
5,000	20,000	.0041	.....	
6,250	25,000	.0051	0.	
7,500	30,000	.0061	0.	
8,750	35,000	.0070	0.	
10,000	40,000	.0081	0.	
11,250	45,000	.0093	0.	
11,500	46,000	.0095	.....	
11,750	47,000	.0096	.....	
12,000	48,000	.0098	.....	Elastic limit. Load fell.
12,250	49,000	.2525	.....	
12,500	50,000	.28	.....	
12,750	51,000	.30	.....	
13,000	52,000	.33	.....	
13,250	53,000	.37	.....	
13,500	54,000	.40	.....	
13,750	55,000	.43	.....	
14,000	56,000	.48	.....	
14,250	57,000	.52	.....	
14,500	58,000	.60	.....	
14,750	59,000	.67	.....	
15,000	60,000	.80	.....	
15,250	61,000	.89	.....	
15,500	62,000	1.12	.....	
15,520	62,080	1.40	.....	Tensile strength.
0	0	1.75	.....	=29.2 per cent.

Elongation of inch sections, ″.20, ″.25, ″.30, ″.56*, ″.24, ″.20.
Fractured near the middle of stem. Appearance, fine silky.
Diameter at fracture, ″.33. Area, .0855 square inch.
Contraction of area, 65.8 per cent.

No. 4234.

Mark, 51.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0019	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0039	.....	
6,250	25,000	.0050	.....	
7,500	30,000	.0060	.....	
8,750	35,000	.0070	.....	
10,000	40,000	.0080	.0001	
11,250	45,000	.0092	.....	
11,500	46,000	.0094	.....	
11,750	47,000	.0096	.....	
11,000	44,000	.1150	.....	
11,250	45,000	.2015	.....	
11,500	46,000	.2160	.....	
11,750	47,000	.2258	.....	Elastic limit. Load fell.
12,000	48,000	.2480	.....	
12,250	49,000	.2600	.....	
12,500	50,000	.2820	.....	
12,750	51,000	.3000	.....	
13,000	52,000	.3350	.....	
13,250	53,000	.37	.....	
13,500	54,000	.40	.....	
13,750	55,000	.42	.....	
14,000	56,000	.49	.....	
14,250	57,000	.53	.....	
14,500	58,000	.58	.....	
14,750	59,000	.66	.....	
15,000	60,000	.78	.....	
15,500	62,000	1.18	.....	
15,520	62,080	.....	.....	Tensile strength.
0	0	1.80	.....	= 30 per cent.

Elongation of inch sections, ″.18, ″.25, ″.28, ″.59*, ″.28, ″.22.
Fractured 2″.85 from the neck. Appearance, fine silky.
Diameter at fracture, ″.32. Area, .0804 square inch.
Contraction of area, 67.8 per cent.

No. 4214.

Mark, 55.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0019	0.	
3,750	15,000	.0027	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0059	0.	
8,750	35,000	.0068	.....	
10,000	40,000	.0079	0.	
11,250	45,000	.0090	.0001	
12,000	48,000	.0097	.....	Elastic limit.
		.2170	.....	Load fell.
12,250	49,000	.....	.....	
12,500	50,000	.....	.....	
12,750	51,000	.....	.....	
13,000	52,000	.2980	.....	
13,250	53,000	.3175	.....	
13,500	54,000	.34	.....	
13,750	55,000	.37	.....	
14,000	56,000	.41	.....	
14,250	57,000	.46	.....	
14,500	58,000	.50	.....	
14,750	59,000	.54	.....	
15,000	60,000	.62	.....	
15,250	61,000	.68	.....	
15,500	62,000	.78	.....	
15,750	63,000	.90	.....	
15,890	63,560	1.31	.....	Tensile strength.
0	0	.....	.....	=29.8 per cent.

Elongation of inch sections, ″.20, ″.26, ″.59*, ″.27, ″.25, ″.22.
Fractured 3″ from the neck. Appearance, fine silky.
Diameter at fracture, ″.33. Area, .0855 square inch.
Contraction of area, 65.8 per cent.

No. 4235.

Mark, 70.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0021	.....	
3,750	15,000	.0031	.....	
5,000	20,000	.0042	.....	
6,250	25,000	.0052	.....	
7,500	30,000	.0062	.....	
8,750	35,000	.0073	.....	
10,000	40,000	.0084	.0002	
11,250	45,000	.0095	.....	Elastic limit.
11,500	46,000	.0098	.....	Load fell.
10,000	40,000	.0160	.....	
10,250	41,000	.0250	.....	
10,500	42,000	.0540	.....	
10,000	40,000	.0907	.....	
10,250	41,000	.1025	.....	
10,500	42,000	.1100	.....	
10,750	43,000	.1191	.....	
10,000	40,000	.1690	.....	
10,250	41,000	.1756	.....	
10,500	42,000	.1792	.....	
10,750	43,000	.1837	.....	
11,000	44,000	.1930	.....	Rested 1½ hours.
11,250	45,000	.2080	.....	
11,500	46,000	.2236	.....	
11,750	47,000	.2375	.....	
12,000	48,000	.2610	.....	
12,500	50,000	.32	.....	
13,000	52,000	.87	.....	
13,500	54,000	.44	.....	
14,000	56,000	.54	.....	
14,500	58,000	.70	.....	
15,000	60,000	.98	.....	
15,020	60,080	.....	.....	Tensile strength.
0	0	1.83	.....	=30.5 per cent.

Elongation of inch sections, ″.19, ″.24, ″.33, ″.59*, ″.26, ″.22.
Fractured 3″.5 from the neck. Appearance, fine silky.
Diameter at fracture, ″.32. Area, .0804 square inch.
Contraction of area, 67.8 per cent.

No. 4236.

Mark, 71.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0022	.....	
3,750	15,000	.0032	.....	
5,000	20,000	.0042	.....	
6,250	25,000	.0053	.....	
7,500	30,000	.0064	.0002	
8,750	35,000	.0076	.....	
10,000	40,000	.0087	.0002	
10,250	41,000	.0089	.....	
10,500	42,000	.0091	.....	
10,750	43,000	.0092	.....	
11,000	44,000	.0095	.....	
11,250	45,000	.0097	.....	
11,500	46,000	.0100	.....	
11,750	47,000	.0102	.....	Elastic limit. Load fell.
10,750	43,000	.0220	.....	
10,250	41,000	.0617	.....	
10,500	42,000	.0880	.....	
10,750	43,000	.1080	.....	
11,000	44,000	.1917	.....	
11,250	45,000	.1968	.....	
11,500	46,000	.2090	.....	
11,750	47,000	.2250	.....	
12,000	48,000	.2460	.....	
12,250	49,000	.2617	.....	
12,500	50,000	.30	.....	
12,750	51,000	.32	.....	
13,000	52,000	.34	.....	
13,500	54,000	.42	.....	
14,000	56,000	.52	.....	
14,500	58,000	.64	.....	
15,000	60,000	.83	.....	
15,240	60,960	1.27	.....	Tensile strength.
0	0	1.78	.....	= 29.7 per cent.

Elongation of inch sections, ″.18, ″.23, ″.27, ″.61*, ″.28, ″.21.
Fractured 3″.25 from the neck. Appearance, fine silky.
Diameter at fracture, ″.31. Area, .0754 square inch.
Contraction of area, 69.8 per cent.

No. 4237.

Marks, 72.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0020	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0039	.....	
6,250	25,000	.0050	.....	
7,500	30,000	.0060	0.	
8,750	35,000	.0069	.....	
10,000	40,000	.0081	0.	
10,750	43,000	.0088	.....	
11,000	44,000	.0090	.....	
11,250	45,000	.0092	.....	Elastic limit.
11,500	46,000	.0097	.....	Load fell.
9,750	39,000	.0127	.....	
10,000	40,000	.0137	.....	
10,250	41,000	.0159	.....	
10,500	42,000	.0325	.....	
10,750	43,000	.1304	.....	
11,000	44,000	.1890	.....	
11,250	45,000	.2045	.....	
11,500	46,000	.2210	.....	
11,750	47,000	.2360	.....	
12,000	48,000	.2540	.....	
12,250	49,000	.2750	.....	
12,500	50,000	.3070	.....	
13,000	52,000	.38	.....	
13,500	54,000	.43	.....	
14,000	56,000	.56	.....	
14,500	58,000	.71	.....	
15,000	60,000	.97	.....	
15,120	60,480	1.29	.....	Tensile strength.
0	0	1.76	.....	=29.3 per cent.

Elongation of inch sections, ″.19, ″.23, ″.26, ″.62*, ″.26, ″.20.
Fractured 3″.25 from the neck. Appearance, fine silky.
Diameter at fracture, ″.31. Area, .0754 square inch.
Contraction of area, 69.8 per cent.

No. 4238.

Mark, 73.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0049	.....	
7,500	30,000	.0060	.....	
8,750	35,000	.0072	.....	
10,000	40,000	.0083	0.	
11,250	45,000	.0096	.....	
11,500	46,000	.0100	.....	
11,750	47,000	.0103	.....	Elastic limit. Load fell.
11,000	44,000	.0460	.....	
11,250	45,000	.1350	.....	
11,500	46,000	.1975	.....	
11,750	47,000	.2100	.....	
12,000	48,000	.2340	.....	
12,250	49,000	.2450	.....	
12,500	50,000	.2750	.....	
13,000	52,000	.3250	.....	
13,500	54,000	.39	.....	
14,000	56,000	.48	.....	
14,500	58,000	.60	.....	
15,000	60,000	.81	.....	
15,310	61,240	1.28	.....	Tensile strength.
0	0	1.79	.....	=29.8 per cent.

Elongation of inch sections, ″.20, ″.27, ″.62*, ″.31, ″.23, ″.16.
Fractured 3″.5 from the neck. Appearance, fine silky.
Diameter at fracture, ″.31. Area, .0754 square inch.
Contraction of area, 69.8 per cent.

No. 4239.

Mark, 74.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0021	.....	
3,750	15,000	.0031	.....	
5,000	20,000	.0042	.....	
6,250	25,000	.0052	.....	
7,500	30,000	.0062	.....	
8,750	35,000	.0074	.....	
10,000	40,000	.0086	.0002	
11,250	45,000	.0097	.....	
12,500	50,000	.0107	.....	
12,750	51,000	.0108	.....	Elastic limit.
13,000	52,000	.0120	.....	Load fell.
11,500	46,000	.0162	.....	
11,750	47,000	.0390	.....	
12,000	48,000	.2050	.....	
12,250	49,000	.2110	.....	
12,500	50,000	.2305	.....	
12,750	51,000	.2470	.....	
13,000	52,000	.2750	.....	
13,250	53,000	.2980	.....	
13,500	54,000	.3360	.....	
14,000	56,000	.41	.....	
14,500	58,000	.52	.....	
15,000	60,000	.69	.....	
15,410	61,640	1.19	.....	Tensile strength.
0	0	1.60	.....	=26.7 per cent.

Elongation of inch sections, ″.17, ″.20, ″.25, ″.57*, ″.24, ″.17.
Fractured 3″.25 from the neck. Appearance, fine silky.
Diameter at fracture, ″.32. Area, .0804 square inch.
Contraction of area, 67.8 per cent.

No. 4240.

Mark, 75.
Diameter, ″.564.
Sectional area, 25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0009	.....	
2,500	10,000	.0019	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0040	.....	
6,250	25,000	.0051	.....	
7,500	30,000	.0061	.....	
8,750	35,000	.0071	.....	
10,000	40,000	.0082	0.	
11,250	45,000	.0091	.....	
12,500	50,000	.0102	.....	Elastic limit. Load fell.
11,250	45,000	.0231	.....	
11,500	46,000	.1080	.....	
11,750	47,000	.1878	.....	
12,000	48,000	.2040	.....	
12,250	49,000	.2165	.....	
12,500	50,000	.2335	.....	
12,750	51,000	.2517	.....	
13,000	52,000	.2890	.....	
13,500	54,000	.36	.....	
14,000	56,000	.43	.....	
14,500	58,000	.57	.....	
15,000	60,000	.74	.....	
15,500	62,000	1.39	.....	Tensile strength.
0	0	1.71	.....	=28.5 per cent.

Elongation of inch sections, ″.18, ″.24, ″.30, ″.57*, ″.23, ″.19.
Fractured 3″.4 from the neck. Appearance, fine silky.
Diameter at fracture, .″31. Area, .0754 square inch.
Contraction of area, 69.8 per cent.

No. 4241.

Mark, 76.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0019	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0039	.....	
6,250	25,000	.0050	.....	
7,500	30,000	.0060	.....	
8,750	35,000	.0070	.....	
10,000	40,000	.0080	.0001	
11,250	45,000	.0091	.....	
12,000	48,000	.0098	.....	
12,250	49,000	.0100	.....	Elastic limit. Load fell.
11,000	44,000	.0250	.....	
11,250	45,000	.0995	.....	
11,500	46,000	.1740	.....	
11,750	47,000	.1817	.....	
12,000	48,000	.2000	.....	
12,250	49,000	.2160	.....	
12,500	50,000	.2380	.....	
12,750	51,000	.2570	.....	
13,000	52,000	.2870	.....	
13,500	54,000	.36	.....	
14,000	56,000	.44	.....	
14,500	58,000	.57	.....	
15,000	60,000	.78	.....	
15,260	61,040	1.20	.....	Tensile strength.
0	0	1.67	.....	=27.8 per cent.

Elongation of inch sections, ″.17, ″.23, ″.49*, ″.37, ″.22, ″.19.
Fractured at middle of stem. Appearance, fine silky.
Diameter at fracture, ″.31. Area, .0754 square inch.
Contraction of area, 69.8 per cent.

No. 4242.

Mark, 77.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	.....	
8,750	35,000	.0069	.....	
10,000	40,000	.0079	0.	
11,250	45,000	.0089	.....	
11,500	46,000	.0091	.....	
11,750	47,000	.0093	.....	
12,000	48,000	.0096	.....	
12,250	49,000	.0099	.....	
12,500	50,000	.0101	.....	
12,750	51,000	.0103	.....	
13,000	52,000	.0105	.....	
13,250	53,000	.0107	.....	
13,500	54,000	.0109	.....	
13,750	55,000	.0111	.....	Elastic limit.
11,750	47,000	.0172	.....	
12,000	48,000	.0257	.....	
11,750	47,000	.0360	.....	
12,000	48,000	.0740	.....	
12,250	49,000	.1940	.....	
12,500	50,000	.2170	.....	
12,750	51,000	.2320	.....	
13,000	52,000	.2500	.....	
13,250	53,000	.2750	.....	
13,500	54,000	.3075	.....	
13,750	55,000	.3340	.....	
14,000	56,000	.37	.....	
14,250	57,000	.41	.....	
14,500	58,000	.48	.....	
14,750	59,000	.52	.....	
15,000	60,000	.65	.....	
15,250	61,000	.73	.....	
15,500	62,000	.97	.....	
15,520	62,080	1.20	.....	Tensile strength.
0	0	1.61	.....	= 26.8 per cent.

Elongation of inch sections, ″.15, ″.20, ″.23, ″.56*, ″.28, ″.19.
Fractured 2″.75 from the neck. Appearance, fine silky.
Diameter at fracture, ″.32. Area, .0804 square inch.
Contraction of area, 67.8 per cent.

SPECIMENS FROM WROUGHT-IRON SHAFTS.

No. 4248.

Mark, 41.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0039	.....	
6,250	25,000	.0049	.....	
7,500	30,000	.0059	0.	
7,750	31,000	.0061	.....	
8,000	32,000	.0063	.....	
8,250	33,000	.0065	.....	
8,500	34,000	.0068	.....	
8,750	35,000	.0070	.....	
9,000	36,000	.0071	.....	Elastic limit. Load fell.
7,500	30,000	.0101	.....	
7,750	31,000	.0141	.....	
8,000	32,000	.0212	.....	
8,250	33,000	.0375	.....	
8,500	34,000	.0653	.....	
8,750	35,000	.1440	.....	
8,000	32,000	.1960	.....	
8,250	33,000	.2010	.....	
8,500	34,000	.2068	.....	
9,000	36,000	.22	.....	
9,500	38,000	.28	.....	
10,000	40,000	.34	.....	
10,500	42,000	.41	.....	
11,000	44,000	.53	.....	
11,500	46,000	.72	.....	
12,000	48,000	1.08	.....	
12,020	48,080	1.39	.....	Tensile strength.
0	0	1.64	.....	= 27.3 per cent.

Elongation of inch sections, ″.19, ″.43*, ″32, ″.27, ″.22, ″.21.
Fractured 2.″25 from the neck. Appearance, fibrous.
Diameter at fracture, ″.41. Area, .132 square inch.
Contraction of area, 47.2 per cent.

No. 4249.

Mark, 42.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0049	.....	
7,500	30,000	.0060	0.	
7,750	31,000	.0061	.....	
8,000	32,000	.0063	.....	
8,250	33,000	.0066	.....	
8,500	34,000	.0068	.....	Elastic limit. Load fell.
7,750	31,000	.0158	.....	
8,000	32,000	.0317	.....	
8,250	33,000	.0440	.....	
8,500	34,000	.0650	.....	
8,000	32,000	.0780	.....	
		.0868	.....	
8,250	33,000	.1017	.....	
8,500	34,000	.1300	.....	
8,750	35,000	.2040	.....	
9,000	36,000	.2165	.....	
9,250	37,000	.2365	.....	
9,500	38,000	.2680	.....	
9,750	39,000	.2925	.....	
10,000	40,000	.3325	.....	
10,500	42,000	.41	.....	
11,000	44,000	.52	.....	
11,500	46,000	.71	.....	
11,960	47,840	1.28	.....	Tensile strength.
0	0	1.50	.....	=25.0 per cent.

Elongation of inch sections, ″.20, ″.48*, ″.23, ″.21, ″.20, ″.18.
Fractured 1″.65 from the neck. Appearance, fibrous.
Diameter at fracture, ″.40. Area, .1257 square inch.
Contraction of area, 49.7 per cent.

No. 4209.

Mark, 43.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0007	.....	
2,500	10,000	.0020	.....	
3,750	15,000	.0031	.....	
5,000	20,000	.0041	.....	
6,250	25,000	.0051	.....	
7,500	30,000	.0061	.....	
7,750	31,000	.0063	.....	
8,000	32,000	.0065	.....	
8,250	33,000	.0068	.....	Elastic limit. Load fell.
8,500	34,000	.1900	.....	
8,750	35,000	.21	.....	
9,000	36,000	.22	.....	
9,250	37,000	.25	.....	
9,500	38,000	.28	.....	
9,750	39,000	.31	.....	
10,000	40,000	.35	.....	
10,250	41,000	.39	.....	
10,500	42,000	.44	.....	
10,750	43,000	.48	.....	
11,000	44,000	.58	.....	
11,250	45,000	.64	.....	
11,500	46,000	.79	.....	
11,750	47,000	.94	.....	
11,890	47,560	1.42	.....	Tensile strength.
0	0	1.62	.....	=77.0 per cent.

Elongation of inch sections, ″.24, ″.52*, ″.25, ″.22, ″.21, ″.18.
Fractured 1″.8 from the neck. Appearance, fibrous.
Diameter at fracture, ″.41. Area, .132 square inch.
Contraction of area, 4.27 per cent.

No. 4210.

Mark, 44.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0009	0.	
2,500	10,000	.0020	.....	
3,750	15,000	.0030	0.	
5,000	20,000	.0041	.0001	
6,250	25,000	.0051	.0001	
7,500	30,000	.0062	.0001	
7,750	31,000	.0064	.....	
8,000	32,000	.0067	.....	
8,250	33,000	.0068	.....	
8,500	34,000	.0071	.....	Elastic limit. Load fell.
8,750	35,000	.1915	.....	
9,000	36,000	.22	.....	
9,250	37,000	.27	.....	
9,500	38,000	.29	.....	
9,750	39,000	.31	.....	
10,000	40,000	.34	.....	
10,250	41,000	.39	.....	
10,500	42,000	.42	.....	
10,750	43,000	.48	.....	
11,000	44,000	.58	.....	
11,250	45,000	.68	.....	
11,500	46,000	.79	.....	
11,750	47,000	1.00	.....	
11,820	47,280	1.29	.....	Tensile strength.
0	0	1.45	.....	=24.2 per cent.

Elongation of inch sections, ″.15, ″.20, ″.21, ″.26, ″.45*, ″.18.
Fractured 2″.25 from the neck. Appearance, fibrous.
Diameter at fracture, ″.39. Area, .119 square inch.
Contraction of area, 52.2 per cent.

No. 4250.

Mark, 45.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0020	.....	
3,750	15,000	.0030	.....	
5,000	20,000	.0041	.....	
6,250	25,000	.0052	.....	
7,500	30,000	.0064	.....	
7,750	31,000	.0066	.....	
8,000	32,000	.0069	.....	
8,250	33,000	.0071	.....	
8,500	34,000	.0073	.....	
8,750	35,000	.0076	.....	
9,000	36,000	.0078	.....	Elastic limit. Load fell.
8,750	35,000	.0248	.....	
8,500	34,000	.0413	.....	
8,750	35,000	.0455	.....	
9,000	36,000	.0778	.....	
9,250	37,000	.1310	.....	
9,500	38,000	.1520	.....	
9,750	39,000	.1580	.....	
10,000	40,000	.1740	.....	
10,250	41,000	.1920	.....	
10,500	42,000	.2150	.....	
11,000	44,000	.27	.....	
11,500	46,000	.31	.....	
12,000	48,000	.38	.....	
12,500	50,000	.47	.....	
13,000	52,000	.59	.....	
13,500	54,000	.82	.....	
13,730	54,920	1.17	.....	Tensile strength.
0	0	1.54	.....	= 25.7 per cent.

Elongation of inch sections, ″.23, ″.45*, ″.28, ″.22, ″.19, ″.17.
Fractured 2″.25 from the neck. Appearance, fibrous, lamellar.
Diameter at fracture, ″.42. Area, .1385 square inch.
Contraction of area, 44.6 per cent.

No. 4211.

Mark, 46.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6′.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0019	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0040	.....	
6,250	25,000	.0049	.....	
7,500	30,000	.0060	.....	
7,750	31,000	.0062	.....	
8,000	32,000	.0064	.....	
8,250	33,000	.0067	.....	
8,500	34,000	.0070	.....	
8,750	35,000	.0072	.....	
9,000	36,000	.0074	.....	
9,250	37,000	.0076	.....	
9,500	38,000	.0079	.....	Elastic limit. Load fell.
9,750	39,000	.1840	.....	
10,000	40,000	.1980	.....	
10,250	41,000	.22	.....	
10,500	42,000	.24	.....	
10,750	43,000	.27	.....	
11,000	44,000	.29	.....	
11,250	45,000	.33	.....	
11,500	46,000	.36	.....	
11,750	47,000	.39	.....	
12,000	48,000	.42	.....	
12,250	49,000	.48	.....	
12,500	50,000	.56	.....	
12,750	51,000	.60	.....	
13,000	52,000	.72	.....	
13,250	53,000	.83	.....	
13,500	54,000	1.19	.....	Tensile strength.
0	0	1.41	.....	=23.5 per cent.

Elongation of inch sections, ″.19, ″.23, ″.26, ″.36*, ″.20, ″.17.
Fractured 3″.25 from the neck. Appearance, fibrous, lamellar.
Diameter at fracture, ″.43. Area, .145 square inch.
Contraction of area, 41.9 per cent.

No. 4211½.

Mark, 48.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	0.	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	0.	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	0.	
7,500	30,000	.0058	0.	
7,750	31,000	.0060	.....	
8,000	32,000	.0062	.....	
8,250	33,000	.0066	.....	
8,500	34,000	.0068	.....	
8,750	35,000	.0069	.....	
9,000	36,000	.0071	.....	
9,250	37,000	.0072	.....	Elastic limit. Load fell.
9,500	38,000	.1665	.....	
9,750	39,000	.1750	.....	
10,000	40,000	.1950	.....	
10,250	41,000	.2050	.....	
10,500	42,000	.226	.....	
10,750	43,000	.244	.....	
11,000	44,000	.27	.....	
11,250	45,000	.30	.....	
11,500	46,000	.33	.....	
11,750	47,000	.37	.....	
12,000	48,000	.40	.....	
12,250	49,000	.43	.....	
12,500	50,000	.49	.....	
12,750	51,000	.55	.....	
13,000	52,000	.64	.....	
13,250	53,000	.75	.....	
13,500	54,000	.96	.....	
13,740	54,960	1.30	.....	Tensile strength.
0	0	1.44	.....	=24.0 per cent.

Elongation of inch sections, ″.19, ″.25, ″.36*, ″.24, ″.21, ″.19.
Fractured 3″.25 from the neck. Appearance, fibrous lamellar.
Diameter at fracture, ″.45. Area, .159 square inch.
Contraction of area, 36.4 per cent.

No. 4212.

Mark, 49.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	0.	
2,500	10,000	.0017	.....	
3,750	15,000	.0027	0.	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	0.	
7,500	30,000	.0058	0.	
7,750	31,000	.0059	.....	
8,000	32,000	.0062	.....	
8,250	33,000	.0064	.....	
8,500	34,000	.0067	.....	
8,750	35,000	.0068	.....	
9,000	36,000	.0070	.....	
9,250	37,000	.0072	.....	Elastic limit. Load fell.
9,500	38,000	.1710	.....	
9,750	39,000	.1775	.....	
10,000	40,000	.1910	.....	
10,250	41,000	.2090	.....	
10,500	42,000	.2290	.....	
10,750	43,000	.2475	.....	
11,000	44,000	.2760	.....	
11,250	45,000	.2970	.....	
11,500	46,000	.3310	.....	
11,750	47,000	.37	.....	
12,000	48,000	.40	.....	
12,250	49,000	.44	.....	
12,500	50,000	.50	.....	
12,750	51,000	.55	.....	
13,000	52,000	.68	.....	
13,250	53,000	.77	.....	
13,500	54,000	.98	.....	
13,610	54,440	1.28	.....	Tensile strength.
0	0	1.53	.....	=25.5 per cent.

Elongation of inch sections, ″.20, ″.26, ″.45*, ″.23, ″.20, ″.19.
Fractured 3″.2 from the neck. Appearance, fibrous, lamellar.
Diameter at fracture, ″.43. Area, .145 square inch.
Contraction of area, 41.9 per cent.

No. 4245.

Marks, 36.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0040	.....	
6,250	25,000	.0050	.....	
7,500	30,000	.0062	0.	
7,750	31,000	.0064	.....	Elastic limit. Load fell.
7,500	30,000	.0380	.....	
7,750	31,000	.0555	.....	
8,000	32,000	.0705	.....	
8,250	33,000	.0875	.....	
8,500	34,000	.1260	.....	
8,750	35,000	.1550	.....	
9,000	36,000	.1735	.....	
9,250	37,000	.1860	.....	
9,500	38,000	.2210	.....	
9,750	39,000	.2335	.....	
10,000	40,000	.2575	.....	
10,250	41,000	.28	.....	
10,500	42,000	.32	.....	
11,000	44,000	.41	.....	
11,500	46,000	.50	.....	
12,000	48,000	.66	.....	
12,500	50,000	.91	.....	
12,680	50,720	1.20	.....	Tensile strength.
0	0	1.51	.....	=25.2 per cent.

Elongation of inch sections, ″.45*, ″.25, ″.27, ″.24, ″.17, ″.13.
Fractured 1″ from the neck. Appearance, fibrous.
Diameter at fracture, ″.41 Area, .132 square inch.
Contraction of area, 47.2 per cent.

No. 4243.

Mark, 37.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0059	0.	
7,750	31,000	.0061	.....	
8,000	32,000	.0063	.....	
8,250	33,000	.0066	.....	
8,500	34,000	.0068	.....	Elastic limit.
8,750	35,000	.0085	.....	Load fell.
8,000	32,000	.0335	.....	
8,250	33,000	.0980	.....	
8,500	34,000	.1550	.....	
8,750	35,000	.1640	.....	
9,000	36,000	.1850	.....	
9,250	37,000	.2040	.....	
9,500	38,000	.2280	.....	
9,750	39,000	.2570	.....	
10,000	40,000	.2860	.....	
10,250	41,000	.31	.....	
10,500	42,000	.36	.....	
10,750	43,000	.39	.....	
11,000	44,000	.44	.....	
11,250	45,000	.50	.....	
11,500	46,000	.57	.....	
11,750	47,000	.64	.....	
12,000	48,000	.78	.....	
12,250	49,000	.91	.....	
12,450	49,800	1.36	.....	Tensile strength.
0	0	1.62	.....	=27 per cent.

Elongation of inch sections, ″.22, ″.48*, ″.28, ″.25, ″.21, ″.18.
Fractured 2″ from the neck. Appearance fibrous.
Diameter at fracture, ″.41. Area, .132 square inch.
Contraction of area, 47.2 per cent.

No. 4244.

Mark, 38.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	0.	
8,000	32,000	.0062	.....	
8,250	33,000	.0064	.....	Elastic limit.
8,500	34,000	.0072	.....	Load fell.
7,500	30,000	.0142	.....	
7,750	31,000	.0220	.....	
8,000	32,000	.0370	.....	
8,250	33,000	.0625	.....	
8,500	34,000	.1740	.....	
8,750	35,000	.1785	.....	
9,000	36,000	.1925	.....	
9,250	37,000	.2080	.....	
9,500	38,000	.2420	.....	
9,750	39,000	.26	.....	
10,000	40,000	.30	.....	
10,500	42,000	.37	.....	
11,000	44,000	.47	.....	
11,500	46,000	.59	.....	
12,000	48,000	.80	.....	
12,430	49,720	1.30	.....	Tensile strength.
0	0	1.62	.....	=27.0 per cent.

Elongation of inch sections, ″.19, ″.26, ″.47*, ″.24, ″.23, ″.23.
Fractured 2″.75 from the neck. Appearance, fibrous.
Diameter at fracture, ″.39. Area, .1194 square inch.
Contraction of area, 52.2 per cent.

No. 4246.

Mark, 39.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	0.	
7,750	31,000	.0060	.....	
8,000	32,000	.0063	.....	Elastic limit. Load fell.
7,500	30,000	.0167	.....	
7,750	31,000	.0218	.....	
8,000	32,000	.0427	.....	
8,250	33,000	.0970	.....	
8,500	34,000	.1750	.....	
8,750	35,000	.1857	.....	
9,000	36,000	.2027	.....	
9,250	37,000	.23	.....	
9,500	38,000	.27	.....	
10,000	40,000	.31	.....	
10,500	42,000	.39	.....	
11,000	44,000	.47	.....	
11,500	46,000	.60	.....	
12,000	48,000	.83	.....	
12,370	49,480	1.40	.....	Tensile strength.
0	0	1.67	.....	=27.8 per cent.

Elongation of inch sections, ″.20, ″.46*, ″.33, ″.24, ″.23, ″.21.
Fractured 2.″5 from the neck. Appearance, fibrous.
Diameter at fracture, ″.39. Area, .1194 square inch.
Contraction of area, 52.2 per cent.

No. 4247.

Mark, 40.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0040	.....	
6,250	25,000	.0051	.....	
7,500	30,000	.0062	0.	
7,750	31,000	.0063	.....	Elastic limit.
8,000	32,000	.0068	.....	Load fell.
7,500	30,000	.0095	.....	
7,750	31,000	.0138	.....	
8,000	32,000	.0365	.....	
8,250	33,000	.0870	.....	
8,500	34,000	.1640	.....	
8,750	35,000	.1765	.....	
9,000	36,000	.1987	.....	
9,250	37,000	.2220	.....	
9,500	38,000	.2470	.....	
9,750	39,000	.2660	.....	
10,000	40,000	.3065	.....	
10,500	42,000	.38	.....	
11,000	44,000	.48	.....	
11,500	46,000	.60	.....	
12,000	48,000	.82	.....	
12,420	49,680	1.18	.....	Tensile strength.
0	0	1.51	.....	=25.2 per cent.

Elongation of inch sections, ″.16, ″.20, ″.20, ″.27, ″.48*, ″.20.
Fractured 2″.25 from the neck. Appearance, fibrous.
Diameter at fracture, ″.39. Area, .1194 square inch.
Contraction of area, 52.2 per cent.

No. 4215.

Mark, 60.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	0.	
5,000	20,000	.0040	.....	
6,250	25,000	.0050	0.	
7,500	30,000	.0061	0.	
7,750	31,000	.0062	.....	
8,000	32,000	.0065	.....	
8,250	33,000	.0067	.....	
8,500	34,000	.0070	.....	
8,750	35,000	.0072	.....	
9,000	36,000	.0074	.....	Elastic limit. Load fell.
9,250	37,000	.1595	.....	
9,500	38,000	.1800	.....	
9,750	39,000	.1980	.....	
10,000	40,000	.2230	.....	
10,250	41,000	.2440	.....	
10,500	42,000	.2720	.....	
10,750	43,000	.2960	.....	
11,000	44,000	.3300	.....	
11,250	45,000	.3640	.....	
11,500	46,000	.42	.....	
11,750	47,000	.47	.....	
12,000	48,000	.52	.....	
12,250	49,000	.58	.....	
12,500	50,000	.70	.....	
12,750	51,000	.80	.....	
13,000	52,000	1.02	.....	
13,070	52,280	1.32	.....	Tensile strength.
0	0	1.60	.....	=26.7 per cent.

Elongation of inch sections, ″.19, ″.21, ″.27, ″.49*, ″.23, ″.21.
Fractured 3″.25 from the neck. Appearance, fibrous.
Diameter at fracture, ″.40. Area, .126 square inch.
Contraction of area, 49.7 per cent.

No. 4216.

Marks, 65.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0009	0.	
2,500	10,000	.0020	.....	
3,750	15,000	.0030	0.	
5,000	20,000	.0040	.....	
6,250	25,000	.0050	0.	
7,500	30,000	.0060	0.	
7,750	31,000	.0062	.....	
8,000	32,000	.0065	.....	
8,250	33,000	.0067	.....	
8,500	34,000	.0070	.....	
8,750	35,000	.0072	.....	
9,000	36,000	.0075	.....	
9,250	37,000	.0077	.....	
9,500	38,000	.0079	.....	Elastic limit. Load fell. Stretching continued under 34,000 pounds per square inch tension.
9,750	39,000	.1890	.....	
10,000	40,000	.2125	.....	
10,250	41,000	.2290	.....	
10,500	42,000	.2500	.....	
10,750	43,000	.2730	.....	
11,000	44,000	.3025	.....	
11,250	45,000	.3250	.....	
11,500	46,000	.3675	.....	
11,750	47,000	.40	.....	
12,000	48,000	.46	.....	
12,250	49,000	.50	.....	
12,500	50,000	.59	.....	
12,750	51,000	.67	.....	
13,000	52,000	.82	.....	
13,250	53,000	1.00	.....	
13,300	53,200	1.22	.....	Tensile strength.
0	0	1.50	.....	= 25.0 per cent.

Elongation of inch sections, ″.15, ″.17, ″.20, ″28, ″.48*, 22.
Fractured 2″ from the neck. Appearance, fibrous.
Diameter at fracture, ″.42. Area, .139 square inch.
Contraction of area, 44.6 per cent.

No. 4251.

Marks, 66.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	0.	
7,750	31,000	.0060	.....	
8,000	32,000	.0062	.....	
8,250	33,000	.0064	.....	
8,500	34,000	.0066	.....	
8,750	35,000	.0069	.....	
9,000	36,000	.0072	.....	Elastic limit. Load fell.
8,000	32,000	.0102	.....	
8,250	33,000	.0120	.....	
8,500	34,000	.0170	.....	
8,750	35,000	.0550	.....	
9,000	36,000	.0838	.....	
9,250	37,000	.1448	.....	
9,500	38,000	.1560	.....	
9,750	39,000	.1680	.....	
10,000	40,000	.1840	.....	
10,500	42,000	.2175	.....	
11,000	44,000	.2620	.....	
11,500	46,000	.31	.....	
12,000	48,000	.38	.....	
12,500	50,000	.46	.....	
13,000	52,000	.59	.....	
13,500	54,000	.82	.....	
13,720	54,880	1.20	.....	Tensile strength.
0	0	1.54	.....	= 25.7 per cent.

Elongation of inch sections, ″.20, ″.26, ″.45*, ″.25, ″.21. ″17.
Fractured 3″.20 from the neck. Appearance, fibrous lamellar.
Diameter at fracture, ″.44. Area, .1521 square inch.
Contraction of area, 39.2 per cent.

No. 4252.

Mark, 67.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0021	.....	
3,750	15,000	.0031	.....	
5,000	20,000	.0042	.....	
6,250	25,000	.0051	.....	
7,500	30,000	.0062	0.	
7,750	31,000	.0063	.....	
8,000	32,000	.0066	.....	
8,250	33,000	.0068	.....	
8,500	34,000	.0071	.....	Elastic limit. Load fell.
7,750	31,000	.0117	.....	
8,000	32,000	.0162	.....	
8,250	33,000	.0302	.....	
8,500	34,000	.0858	.....	
8,750	35,000	.1225	.....	
9,000	36,000	.1450	.....	
9,250	37,000	.1575	.....	
9,500	38,000	.1740	.....	
9,750	39,000	.1875	.....	
10,000	40,000	.2060	.....	
10,500	42,000	.25	.....	
11,000	44,000	.30	.....	
11,500	46,000	.36	.....	
12,000	48,000	.42	.....	
12,500	50,000	.52	.....	
13,000	52,000	.70	.....	
13,450	53,800	1.25	.....	Tensile strength.
0	0	1.57	.....	= 26.2 per cent.

Elongation of inch sections, ″.25, ″.25, ″.25, ″.44*, ″.21, ″.17.
Fractured 3″ from the neck. Appearance, fibrous lamellar.
Diameter at fracture, ″.43. Area, .1452 square inch.
Contraction of area, 41.9 per cent.

No. 4253.

Mark, 68.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0009	.....	
2,500	10,000	.0019	.....	
3,750	15,000	.0029	.....	
5,000	20,000	.0039	.....	
6,250	25,000	.0049	.....	
7,500	30,000	.0060	0.	
8,000	32,000	.0065	.....	
8,250	33,000	.0067	.....	Elastic limit. Load fell.
7,250	29,000	.0205	.....	
7,500	30,000	.0368	.....	
7,750	31,000	.0490	.....	
8,000	32,000	.1125	.....	
8,500	34,000	.1502	.....	
9,000	36,000	.1820	.....	
9,500	38,000	.2170	.....	
10,000	40,000	.2652	.....	
10,500	42,000	.31	.....	
11,000	44,000	.38	.....	
11,500	46,000	.48	.....	
12,000	48,000	.61	.....	
12,500	50,000	.82	.....	
12,830	51,320	1.19	.....	Tensile strength.
0	0	1.47	.....	=24.5 per cent.

Elongation of inch sections, ″.17, ″.18, ″.20, ″.20, ″.34, ″.38*.
Fractured 1″.4 from the neck. Appearance fibrous.
Diameter at fracture, ″.37. Area, .1075 square inch.
Contraction of area, 57.0 per cent.

No. 4254.

Marks, 78.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0021	.....	
3,750	15,000	.0032	.....	
5,000	20,000	.0042	.....	
6,250	25,000	.0052	.....	
7,500	30,000	.0063	.0002	
7,750	31,000	.0065	.....	
8,000	32,000	.0067	.....	
8,250	33,000	.0069	.....	
8,500	34,000	.0071	.....	
8,750	35,000	.0074	.....	
9,000	36,000	.0076	.....	
9,250	37,000	.0078	.....	Elastic limit. Load fell.
8,000	32,000	.0155	.....	
8,250	33,000	.0280	.....	
8,500	34,000	.0655	.....	
8,750	35,000	.1050	.....	
9,000	36,000	.2148	.....	
9,250	37,000	.2213	.....	
9,500	38,000	.2368	.....	
9,750	39,000	.2650	.....	
10,000	40,000	.2955	.....	
10,500	42,000	.39	.....	
11,000	44,000	.47	.....	
11,500	46,000	.61	.....	
12,000	48,000	.80	.....	
12,370	49,480	1.47	.....	Tensile strength.
0	0	1.82	.....	=30.3 per cent.

Elongation of inch sections, ″.21, ″.30, ″.34, ″.51*, ″.26, ″.20.
Fractured 3″.5 from the neck. Appearance fibrous.
Diameter at fracture, ″.46. Area, .1257 square inch.
Contraction of area, 49.7 per cent.

No. 4255.

Mark, 79.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0010	.....	
2,500	10,000	.0020	.....	
3,750	15,000	.0030	.....	
5,000	20,000	.0041	.....	
6,250	25,000	.0051	.....	
7,500	30,000	.0061	0.	
8,000	32,000	.0066	.....	
8,250	33,000	.0068	.....	
8,500	34,000	.0070	.....	
8,750	35,000	.0072	.....	
9,000	36,000	.0074	.....	
9,250	37,000	.0077	.....	
9,500	38,000	.0079	.....	Elastic limit. Load fell.
8,000	32,000	.0150	.....	
8,250	33,000	.0178	.....	
8,500	34,000	.0295	.....	
8,750	35,000	.0438	.....	
9,000	36,000	.0868	.....	
9,250	37,000	.2268	.....	
9,500	38,000	.2350	.....	
9,750	39,000	.2465	.....	
10,000	40,000	.29	.....	
10,500	42,000	.36	.....	
11,000	44,000	.44	.....	
11,500	46,000	.57	.....	
12,000	48,000	.74	.....	
12,500	50,000	1.33	.....	Tensile strength.
0	0	1.61	.....	=26.8 per cent.

Elongation of inch sections, ″.19, ″.22, ″.22, ″.22, ″.28, ″.48*.
Fractured 1″.1 from neck. Appearance, fibrous.
Diameter at fracture, ″.38. Area, .1134 square inch.
Contraction of area, 54.6 per cent.

No. 4256.

Mark, 80.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0037	.....	
6,250	25,000	.0046	.....	
7,500	30,000	.0058	0.	
8,000	32,000	.0061	.....	
8,250	33,000	.0064	.....	
8,500	34,000	.0065	.....	
8,750	35,000	.0067	.....	
9,000	36,000	.0070	.....	Elastic limit. Load fell.
7,750	31,000	.0208	.....	
8,000	32,000	.0240	.....	
8,250	33,000	.0280	.....	
8,500	34,000	.0346	.....	
8,750	35,000	.0520	.....	
9,000	36,000	.2120	.....	
9,250	37,000	.2205	.....	
9,500	38,000	.2370	.....	
9,750	39,000	.2550	.....	
10,000	40,000	.2980	.....	
10,500	42,000	.38	.....	
11,000	44,000	.47	.....	
11,500	46,000	.58	.....	
12,000	48,000	.77	.....	
12,360	49,440	1.22	.....	Tensile strength.
0	0	1.70	.....	=28.3 per cent.

Elongation of inch sections, ″.17, ″.22, ″.25, ″.29, ″.51*, ″.25.
Fractured 2″.25 from the neck. Appearance, fibrous.
Diameter at fracture, ″.39. Area, .1194 square inch.
Contraction of area, 52.2 per cent.

No. 4257.

Mark, 81.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0028	.....	
5,000	20,000	.0038	.....	
6,250	25,000	.0049	.....	
7,000	30,000	.0060	0.	
8,000	32,000	.0064	.....	
8,250	33,000	.0067	.....	
8,500	34,000	.0069	.....	
8,750	35,000	.0070	.....	
9,000	36,000	.0072	.....	
9,250	37,000	.0075	.....	Elastic limit. Load fell.
8,000	32,000	.0160	.....	
8,250	33,000	.0230	.....	
8,500	34,000	.0395	.....	
8,750	35,000	.0765	.....	
9,000	36,000	.1440	.....	
9,250	37,000	.2290	.....	
9,500	38,000	.2440	.....	
9,750	39,000	.2690	.....	
10,000	40,000	.3050	.....	
10,500	42,000	.40	.....	
11,000	44,000	.50	.....	
11,500	46,000	.62	.....	
12,000	48,000	.94	.....	
12,180	48,720	.....	.....	Tensile strength.
0	0	1.44	.....	= 24.0 per cent.

Elongation of inch sections, ″.15, ″.18, ″.19, ″.22, ″.32, ″.38*.
Fractured 1″.25 from the neck. Appearance, fibrous, lamellar.
Diameter at fracture, ″.40. Area, .1257 square inch.
Contraction of area, 49.7 per cent.

No. 4258.

Mark, 82.
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 6″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Elongation.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
250	1,000	0.	0.	Initial load.
1,250	5,000	.0008	.....	
2,500	10,000	.0018	.....	
3,750	15,000	.0027	.....	
5,000	20,000	.0037	.....	
6,250	25,000	.0048	.....	
7,500	30,000	.0058	—.0001	
8,000	32,000	.0062	.....	
8,250	33,000	.0065	.....	
8,500	34,000	.0067	.....	
8,750	35,000	.0069	.....	
9,000	36,000	.0071	.....	
9,250	37,000	.0073	.....	
9,500	38,000	.0076	.....	Elastic limit. Load fell.
7,750	31,000	.0165	.....	
8,000	32,000	.0193	.....	
8,250	33,000	.0375	.....	
8,500	34,000	.0650	.....	
8,750	35,000	.1850	.....	
9,000	36,000	.1955	.....	
9,250	37,000	.2060	.....	
9,500	38,000	.2412	.....	
9,750	39,000	.2550	.....	
10,000	40,000	.2960	.....	
10,500	42,000	.38	.....	
11,000	44,000	.44	.....	
11,500	46,000	.58	.....	
12,000	48,000	.80	.....	
12,310	49,240	1.30	.....	Tensile strength.
0	.0	1.64	.....	=27.3 per cent.

Elongation of inch sections, ″.20, ″.24, ″.47*, ″.29, ″.24, ″.20.
Fractured 3″.4 from the neck. Appearance, fibrous.
Diameter at fracture, ″.41. Area, .132 square inch.
Contraction of area, 47.2 per cent.

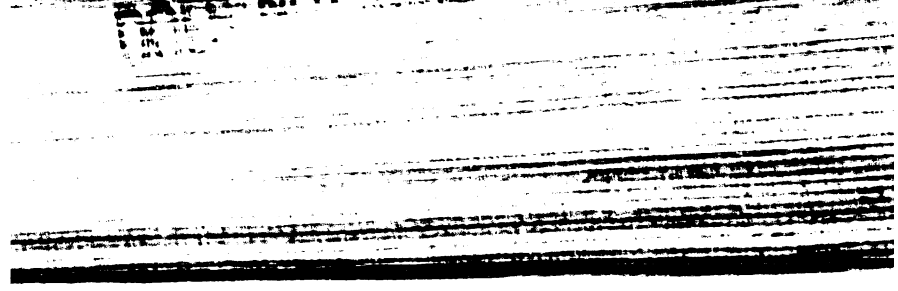
TABULATION OF TENSILE SPECIMENS FROM BARS RUPTURED BY ENDURANCE TESTS OF ROTATING SHAFTS.

Tension-test number.	Endurance-test number.	Mark on bar.	Material.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 6 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.					
											"	"	"	"	"	"
				Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*							
4230	31	1	O. H. steel	.564	.25	58,000	63,520	26.7	67.8	Fine silky	.15,	.20,	.28,	.56*,	.24,	.17
4231	32	1	do	.564	.25	51,000	62,920	26.7	67.8	do	.16,	.21,	.28,	.57*,	.22,	.16
4232	33	1	do	.564	.25	53,000	62,800	26.2	69.8	do	.16,	.20,	.26,	.56*,	.22,	.17
4233	34	1	do	.564	.25	52,000	62,320	26.7	69.8	do	.16,	.24,	.57*,	.23,	.21,	.19
4213	50	2	do	.564	.25	48,000	62,080	29.2	65.8	do	.20,	.25,	.30,	.56*,	.24,	.20
4234	51	2	do	.564	.25	47,000	62,080	30.0	67.8	do	.18,	.25,	.28,	.59*,	.28,	.22
4214	55	3	do	.564	.25	48,000	63,560	29.8	65.8	do	.20,	.26,	.59*,	.27,	.25,	.22
4235	70	4	do	.564	.25	45,000	60,080	30.5	67.8	do	.19,	.24,	.33,	.59*,	.26,	.22
4236	71	4	do	.564	.25	47,000	60,980	29.7	69.8	do	.18,	.23,	.27,	.61*,	.28,	.21
4237	72	4	do	.564	.25	45,000	60,480	29.3	69.8	do	.19,	.23,	.26,	.62*,	.26,	.20
4238	73	4	do	.564	.25	47,000	61,240	29.8	69.8	do	.20,	.27,	.62*,	.31,	.23,	.16
4239	74	5	do	.564	.25	51,000	61,640	26.7	67.8	do	.17,	.20,	.25,	.57*,	.24,	.17
4240	75	5	do	.564	.25	50,000	62,000	28.5	69.8	do	.18,	.24,	.30,	.57*,	.23,	.19
4241	76	5	do	.564	.25	49,000	61,040	27.8	69.8	do	.17,	.23,	.49*,	.37,	.22,	.19
4242	77	5	do	.564	.25	55,000	62,080	26.8	67.8	do	.15,	.20,	.23,	.56*,	.28,	.19
4248	41	1	Wrought iron.	.564	.25	36,000	48,080	27.3	47.2	Fibrous	.19,	.43*,	.32,	.27,	.22,	.21
4249	42	1	do	.564	.25	34,000	47,840	25.0	49.7	do	.20,	.48*,	.23,	.21,	.20,	.18
4209	43	1	do	.564	.25	33,000	47,560	27.0	47.2	do	.24,	.52*,	.25,	.22,	.21,	.18
4210	44	1	do	.564	.25	34,000	47,280	24.2	52.2	do	.15,	.20,	.21,	.26,	.45*,	.18
4250	45	2	do	.564	.25	36,000	54,920	25.7	44.6	Fibrous, lamellar	.23,	.45*,	.28,	.22,	.19,	.17
4211	46	2	do	.564	.25	38,000	54,000	23.5	41.9	do	.19,	.23,	.26,	.36*,	.20,	.17
4211½	48	2	do	.564	.25	37,000	54,960	24.0	36.4	do	.19,	.25,	.36*,	.24,	.21,	.19
4212	49	2	do	.564	.25	37,000	54,440	25.5	41.9	do	.20,	.26,	.45*,	.23,	.20,	.19
4245	36	3	do	.564	.25	31,000	50,720	25.2	47.2	Fibrous	.45*,	.25,	.27,	.24,	.17,	.13
4243	37	3	do	.564	.25	34,000	49,800	27.0	47.2	do	.22,	.48*,	.28,	.25,	.21,	.18
4244	38	3	do	.564	.25	33,000	49,720	27.0	52.2	do	.19,	.26,	.47*,	.24,	.23,	.23
4246	39	3	do	.564	.25	32,000	49,480	27.8	52.2	do	.20,	.46*,	.33,	.24,	.23,	.21
4247	40	3	do	.564	.25	31,000	49,680	25.2	52.2	do	.16,	.20,	.20,	.27,	.48*,	.20
4215	60	4	do	.564	.25	36,000	52,280	26.7	49.7	do	.19,	.21,	.27,	.49*,	.23,	.21
4216	65	5	do	.564	.25	28,000	53,200	25.0	44.6	do	.15,	.17,	.20,	.28,	.48,	.22
4251	66	5	do	.564	.25	36,000	54,880	25.7	39.2	Fibrous, lamellar	.20,	.26,	.45*,	.25,	.21,	.17
4252	67	5	do	.564	.25	34,000	53,800	26.2	41.9	do	.25,	.25,	.25,	.44*,	.21,	.17
4253	68	5	do	.564	.25	33,000	51,320	24.5	57.0	Fibrous	.17,	.18,	.20,	.20,	.34,	.38*
4254	78	6	do	.564	.25	37,000	49,480	30.3	49.7	do	.21,	.30,	.34,	.51*,	.26,	.20
4255	79	6	do	.564	.25	38,000	50,000	26.8	54.6	do	.19,	.22,	.22,	.22,	.28,	.48*
4256	80	6	do	.564	.25	36,000	49,440	28.3	52.2	do	.17,	.22,	.25,	.29,	.51*,	.26
4257	81	6	do	.564	.25	37,000	48,720	24.0	49.7	Fibrous, lamellar	.15,	.18,	.19,	.22,	.32,	.38*
4258	82	6	do	.564	.25	38,000	49,240	27.3	47.2	Fibrous	.20,	.24,	.47*,	.20,	.24,	.20

NATURAL STONES AND BUILDING MATERIAL.

COEFFICIENT OF EXPANSION, COMPRESSION TESTS, AND TRANSVERSE TESTS.

1097



The expansion of the stones was determined on a gauged length of about 20 inches.

The specimens were prepared with ¼-inch drilled holes, into which were driven brass plugs, and in the ends of the plugs were made small drilled and counter-sunk holes defining the extremities of the gauged length.

The stones were first measured in the open air, afterward in water baths of different temperature, the temperature of the cold bath being about 33.5° F.; that of the hot bath in the vicinity of 180° to 200° F.

The details of the tests show a very decided swelling of the stones in most cases after soaking for a time in water, which effect was generally increased by the hot over that of the cold water.

In order to eliminate the effect of this swelling and obtain coefficients of expansion for the wet material due principally or solely to change in temperature, the values of the coefficients as computed are from the contractions of the stones while returning from the temperature of the hot to the temperature of the cold bath.

The same specimens were used in compression tests, and when not fractured in this manner were ruptured finally by transverse stress.

The compression tests were undertaken chiefly to investigate the moduli of elasticity under different loads and the behavior of the material under ascending and descending stresses.

The moduli of elasticity have been computed between different stresses, deducting the permanent sets in each case, and these values are stated in the details of the tests.

DETAILS OF COEFFICIENT OF EXPANSION EXPERIMENTS.

No. 5001.

HOOSIER BUFF, OOLITIC LIMESTONE, FROM BEDFORD, IND.

Dimensions, 24″ × 6″.03 × 4″.
Original gauged length in air, 20″.0033.
Temperature of room, 60° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
57	.....	20.0035	.0002	After soaking in bath 14 days. When placed in hot bath air escapes from stone.
178	4¼	20.0168	.0133	
33.5	20½	20.0059	.0109	Cooled in air.

No. 5002.

INDIANA LIMESTONE.

Dimensions, 23″.98 × 6″.03 × 4″.06.
Original gauged length in air, 20″.0084.
Temperature of room, 68° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	½	20.0074	.0010	
33.5	1	20.0069	.0005	Air continues to escape from stone in steady stream.
33.5	2	20.0070	.0001	Air continues to escape from stone.
33.5	3	20.0071	.0001	Do.
33.5	19	20.0074	.0004	
34	1	20.0074	0.	Removed from bath.
		20.0080	.0006	In air 3 days. Temperature of room, 68° F.
176	5½	20.0210	.0130	Returned to bath.
178.5	2½	20.0205	.0005	
67	15	20.0116	.0089	
179	6½	20.0221	.0105	
177	1½	20.0223	.0002	
76	15	20.0132	.0091	
33.5	½	20.0124	.0008	
33.5	4½	20.0120	.0004	
33.5	6	20.0115	.0005	
34	96	.....	.....	
50	66	20.0118	.0003	

No. 5003.

VERMONT MARBLE.

Dimensions, 23″.94 × 5″.99 × 3″.98.
Original gauged length in air, 19″.9989.
Temperature of room, 71° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	½	19.9988	.0001	
33.5	4	19.9989	.0001	
33.5	24	19.9993	.0004	
33.5	30½	20.0000	.0007	
33.5	48	19.9994	.0006	
33.5	53	19.9995	.0001	
33.5	144	19.9990	.0005	
53	.....	20.0000	.0010	After soaking in bath 14 days.
203	7	20.0239	.0239	
71	16	20.0109	.0130	
194	5	20.0223	.0114	
34	18	20.0117	.0106	
34	26	20.0119	.0002	
34	42½	20.0118	.0001	

No. 5004.

LEE (MASS.) MARBLE.

Dimensions, 23″.97 × 6″ × 3″.97.
Original gauged length in air, 20″.0061.
Temperature of room, 60° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
54	.....	20.0060	.0001	After soaking in bath 7 days 4 hours.
189.5	6	20.0236	.0176	
184	7½	20.0217	.0019	
184	4½	20.0221	.0004	
33.5	19½	20.0061	.0160	Cooled in air.

No. 5005.

POTOMAC RED SANDSTONE.

Dimensions, 24″.01 × 6″.01 × 4″.02.
Original gauged length in air, 20″.0034.
Temperature of room, 72° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	½	20.0016	.0018	
33.5	1½	20.0010	.0006	
33.5	17½	20.0020	.0010	
33.5	18	20.0021	.0001	Removed from bath.
		20.0045	.0024	In air 2 days. Temperature of room, 68° F.
53.5	.....	20.0045	.0	After soaking in bath 19 days.
187	3½	20.0182	.0137	
58.5	16	20.0050	.0132	
183	7½	20.0187	.0137	
64.5	16	20.0061	.0126	
33.5	1	20.0035	.0026	
33.5	31½	20.0036	.0001	

No. 5006.

PORTLAND RED SANDSTONE.

Dimensions, 24″ × 5″.97 × 3″.97.
Original gauged length in air, 19″.9912.
Temperature of room, 74° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	1/3	19.9906	.0006	
33.5	16	19.9936	.0030	
33.5	22	19.9936	0.	
33.5	24	19.9934	.0002	
33.5	40	19.9932	.0002	
33.5	46½	19.9930	.0002	
33.5	48	19.9935	.0005	
33.5	64½	19.9936	.0001	
180	4½	20.0105	.0169	
182	1½	20.0095	.0010	
56 to 58	.....	19.9969	.0126	After soaking in bath 6½ days.
33.5	1/3	19.9968	.0001	
33.5	7	19.9954	.0014	
33.5	71	19.9951	.0003	

No. 5007.

OHIO SANDSTONE.

Dimensions, 23″.96 × 5″.98 × 3″.97.
Original gauged length in air, 20″.0019.
Temperature of room, 70° F.

Bath.		Gauged length.		Remarks.
Temepra-ture (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
63	.....	20.0037	.0018	After soaking in bath 12 days 4 hours. When placed in hot bath, pieces flaked off corners near middle of length, where hand-screw used in handling was clamped.
183	2½	20.0187	.0150	Air escapes from pores. Cooled in air.
33.5	26½	20.0001	.0186	
33.5	71½	20.0005	.0004	

No. 5008.

MONSON (ME.) SLATE.

Dimensions, 24″.07 × 6″.13 × 4″.10.
Original gauged length in air, 19″.9954.
Temperature of room, 68° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	−½	19.9949	.0005	
33.5	−¼	19.9940	.0009	
33.5	2	19.9934	.0006	
33.5	4½	19.9933	.0001	
33.5	6	19.9928	.0005	
33.5	7	19.9935	.0007	
33.5	22½	19.9934	.0001	Removed from bath.
		19.9971	.0037	In air 12 hours. Temperature of room, 68° F.
61	.....	19.9965	.0006	After soaking in bath 17 days.
195	8	20.0096	.0131	
68.5	16	19.9977	.0118	
191	6½	20.0108	.0131	
34	41½	19.9951	.0157	
34	65	19.9950	.0001	

No. 5009.

NORTH RIVER BLUE STONE.

Dimensions, 23″.98 × 6″. × 4″.
Original gauged length in air, 20″.0052.
Temperature of room, 67° F.

Bath.		Gauged length.		Remarks.
Temperature, degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	¼	20.0026	.0026	
33.5	1½	20.0018	.0008	
33.5	5	20.0019	.0001	Removed from bath.
		20.0059	.0040	In air 2½ days. Temperature of room, 68° F.
59	.....	20.0146	.0087	After soaking in bath 21 days.
192	7	20.0340	.0196	
61.5	17	20.0182	.0158	
34	¼	20.0155	.0027	
34	5½	20.0151	.0003	
34	76½	20.0156	.0004	

No. 5010.

WORCESTER GRANITE.

Dimensions, 24″.02 × 6″.01 × 4″.01.
Original gauged length in air, 20″.0023.
Temperature of room, 74° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
33.5	½	20.0015	.0008	
33.5	4	20.0010	.0005	
33.5	7	20.0011	.0001	
33.5	23	20.0015	.0004	
33.5	31	20.0014	.0001	
33.5	50	20.0018	.0004	
49	83	20.0009	.0009	After soaking in bath 3 days 21 hours.
33.5	8	20.0017	.0008	
55.5	.....	20.0029	.0012	After soaking in bath 10 days.
182.5	7	20.0163	.0134	
45	16	20.0043	.0120	
183	2¼	20.0166	.0123	
60.5	23	20.0059	.0107	
33.5	½	20.0016	.0012	
33.5	30½	20.0044	.0002	
33.5	46½	20.0049	.0005	

No. 5011.

QUINCY GRANITE.

Dimensions, 24″ × 6″ × 4″.
Original gauged length in air, 19″.9951.
Temperature of room, 72° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
53	.....	19.9952	.0001	After soaking in bath 10 days.
199	5½	20.0079	.0127	
179	6	20.0062	.0017	
33.5	24	19.9953	.0109	
33.5	49½	19.9957	.0004	
33.5	65½	19.9957	0.	

No. 5012.

CAPE ANN GRANITE.

Dimensions, 24″ × 6″.02 × 4″.01.
Original gauged length in air, 19″.9303.
Temperature of room, 58° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
66	.....	19.9315	.0012	After soaking in bath 11 days.
179	7½	19.9395	.0080	
181	4	19.9401	.0006	
33.5	23¾	19.9310	.0091	

No. 5013.

RED BRICK NO. 1.

Dimensions, 7″.84 × 3″.53 × 2″.18.
Weight, 4 pounds 11¼ ounces.
Original gauged length in air, 6″.0852.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.)	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
52	42½	6.0850	.0002	
184	3¾	6.0874	.0024	
34	186	6.0842	.0032	Removed from hot bath. Weight, 4 pounds 15 ounces.

No. 5014.

RED BRICK NO. 2.

Dimensions, 7″.85 × 3″.61 × 2″.23.
Weight, 4 pounds 12¼ ounces.
Original gauged length in air, 6″.0109.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.)	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
52	42½	6.0107	.0002	
184	3¾	6.0129	.0022	
34	186	6.0106	.0023	Removed from hot bath. Weight, 5 pounds 1¼ ounces.

No. 5015.

RED BRICK No. 3.

Dimensions, 7″.70 × 3″.58 × 2″.21.
Weight, 4 pounds 10½ ounces.
Original gauged length in air, 5″.9396.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
52	42¾	5.9391	.0005	
184	4	5.9417	.0026	
				Removed from hot bath. Weight, 4 pounds 14¼ ounces.
34	186	5.9394	.0023	

No. 5016.

RED BRICK No. 4.

Dimensions, 7″.78 × 3″.58 × 2″.22.
Weight, 4 pounds 12¼ ounces.
Original gauged length in air, 6″.0204.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
52	42¾	6.0200	.0004	
184	4	6.0224	.0024	
				Removed from hot bath. Weight, 5 pounds ¼ ounce.
34	186	6.0195	.0029	

No. 5017.

FIRE BRICK No. 1.

Dimensions, 9″.21 × 4″.52 × 2″.58.
Weight, 6 pounds 15¼ ounces.
Original gauged length in air, 5″.9968.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
52	42¾	5.9967	.0001	
184	4	5.9994	.0024	
				Removed from hot bath. Weight, 7 pounds 14¼ ounces. Placed in cold bath.
34	186	5.9968	.0026	

No. 5018.

Fire Brick No. 2.

Dimensions, 9″.26 × 4″.55 × 2″.53.
Weight, 6 pounds 13¾ ounces.
Original gauged length in air, 5″.9988.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
52	42½	5.9984	.0004	
184	4½	6.0010	.0026	Removed from hot bath. Weight, 7 pounds 13½ ounces. Placed in cold bath.
34	186	5.9988	.0022	

No. 5019.

Hollow Fire proof Building Block, from St. Paul, Minn.

Weight, 10 pounds 12½ ounces.
Dimensions, 12″ × 6″ × 4″.
Hollow core, 1⅝″ × 3⅝″.
Original gauged length in air, 10″.0036.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
185	4½	10.0076	.0040	Weight, 12 pounds 13 ounces.
60	164	.....	.....	
34	53½	10.0032	.0044	

No. 5020.

Ashler Brick, marked E_1, from Fiske, Coleman & Co., Boston, Mass.

Dimensions, 12″ × 3″ × 4″.
Weight, 8 pounds 13¾ ounces.
Original gauged length in air, 10″.0218.
Temperature of room, 75° F.

Bath.		Gauged length.		Remarks.
Temperature (degrees, F.).	Time exposed.	Total.	Successive difference.	
	Hours.	*Inches.*	*Inch.*	
185	4½	10.0245	.0027	Weight, 9 pounds 9½ ounces.
60	164	.....	.....	
34	53½	10.0217	.0028	

TABULATION OF COEFFICIENTS OF EXPANSION OF STONES, AS DETERMINED IN WATER BATHS.

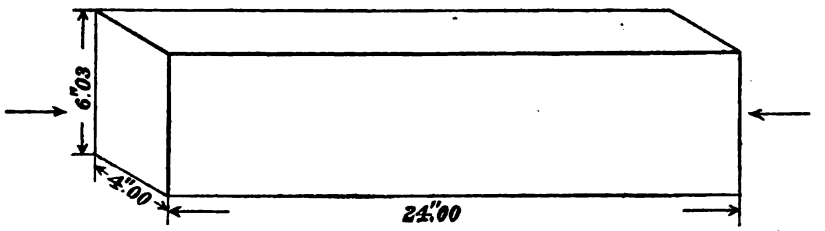
Description of stones.			Original gauged length in air.	Temperature of baths, F.			Gauged lengths.			Coefficient of expansion.
Name.	Quarry.	Location.		Hot.	Cold.	Difference.	Hot.	Cold.	Difference.	
			Inches.	°	°	°	*Inches.*	*Inches.*	*Inch.*	
Hoosier Buff Oolitic limestone		Indiana	20.0033	178	33.5	144.5	26.0168	20.0059	.0109	.00000375
Limestone		do	20.0084	177	33.5	143.5	20.0223	20.0115	.0108	.00000376
Marble		Vermont	19.9989	203	34	169	20.0239	20.0117	.0122	.00000361
Marble	Lee	Massachusetts	20.0061	189.5	33.5	156	20.0236	20.0061	.0175	.00000562
Red sandstone	Potomac Red Sandstone Co	Maryland	20.0034	183	33.5	149.5	20.0187	20.0035	.0152	.00000501
Red sandstone	Brainard Quarry Co., Portland	Connecticut	19.9912	180	33.5	146.5	20.0105	19.9951	.0154	.00000526
Sandstone		Ohio	20.0019	183	33.5	149.5	20.0187	20.0001	.0186	.00000622
Slate	Monson	Maine	19.9954	194	34	160	20.0108	19.9950	.0158	.00000500
Bluestone		New York	20.0052	192	33.5	158.5	20.0340	20.0151	.0189	.00000596
Granite	Worcester Quarry, Milford	Massachusetts	20.0023	183	33.5	149.5	20.0166	20.0044	.0122	.00000406
Granite*	Quincy	do	19.9951	199	33.5	165.5	20.0079	19.9953	.0126	.00000381
Granite	Rockport Granite Co., Cape Ann.	do	19.9303	181	33.5	147.5	19.9401	19.9310	.0091	.00000311
Red brick, No. 1	Manufactured		6.0852	184	34	150	6.0874	6.0842	.0032	.00000351
Red brick, No. 2	do		6.0109	184	34	150	6.0129	6.0106	.0023	.00000255
Red brick, No. 3	do		5.9396	184	34	150	5.9417	5.9394	.0023	.00000258
Red brick, No. 4	do		6.0204	184	34	150	6.0224	6.0195	.0029	.00000321
Fire brick, No. 1	do		5.9968	184	34	150	5.9994	5.9968	.0026	.00000289
Fire brick, No. 2	do		5.9988	184	34	150	6.0010	5.9988	.0022	.00000244
Ashler brick E	do		10.0218	185	34	151	10.0245	10.0217	.0028	.00000185
Hollow fireproof building brick	do		10.0036	185	34	151	10.0076	10.0032	.0044	.00000292

* Quarried about the year 1840. Specimens taken from the old post-office building, State street, Boston, Mass.

No. 5001*a*.

HOOSIER BUFF OOLITIC (INDIANA) LIMESTONE.

COMPRESSION TEST.



Sectional area, 24.12 square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inches.*	*Inch.*	
2,412	100	0.	0.	Initial load.
4,824	200	.0003	.....	E = 3,600,000.
9,648	400	.0010	.....	
14,472	600	.0023	.....	
19,296	800	.0037	.....	
24,120	1,000	.0050	0.	E = 3,125,000.
33,768	1,400	.0078	.....	
43,416	1,800	.0105	.....	
53,064	2,200	.0134	.....	
62,712	2,600	.0164	.....	
72,360	3,000	.0195	.....	
53,064	2,200	.0158	.....	
24,120	1,000	.0082	.....	
14,472	600	.0053	.0017	
14,472	600	.0041	.....	
24,120	1,000	.0070	.....	
53,064	2,200	.0145	.....	
72,360	3,000	.0196	.....	
82,008	3,400	.0230	.....	
91,656	3,800	.0276	.....	
99,100	4,109	.....	.....	Ultimate strength.

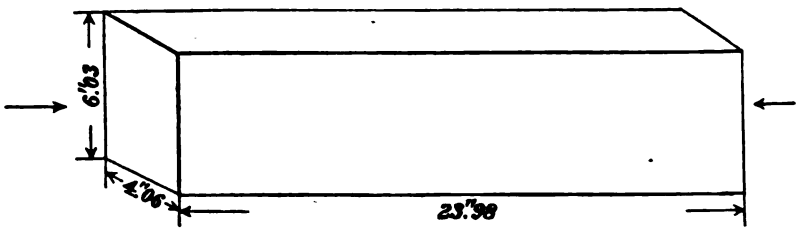
Opened oblique longitudinal fractures, leaving a wedged-shaped fragment at each end of the stone.

Rapid yielding gave warning of impending fracture one-half minute preceding final rupture.

No. 5002*a*.

INDIANA LIMESTONE.

COMPRESSION TEST.



Sectional area, 24.48 square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,448	100	0.	0.	Initial load.
4,896	200	.0003	.....	E = 5,225,200.
9,792	400	.0013	.....	
14,688	600	.0023	.....	
19,584	800	.0031	.....	
24,480	1,000	.0040	.0002	
34,272	1,400	.0055	.....	
44,064	1,800	.0069	.....	
53,856	2,200	.0082	.....	
63,648	2,600	.0096	.....	
73,440	3,000	.0110	—.0001	
83,232	3,400	.0123	.....	
93,024	3,800	.0142	.....	
102,816	4,200	.0158	.....	
112,608	4,600	.0178	.....	
122,400	5,000	.0199	.....	Ultimate strength.

Sustained maximum load ½ minute, then failed, separating into wedge-shaped fragments.

No. 5003*a*.

VERMONT MARBLE.

COMPRESSION TEST.

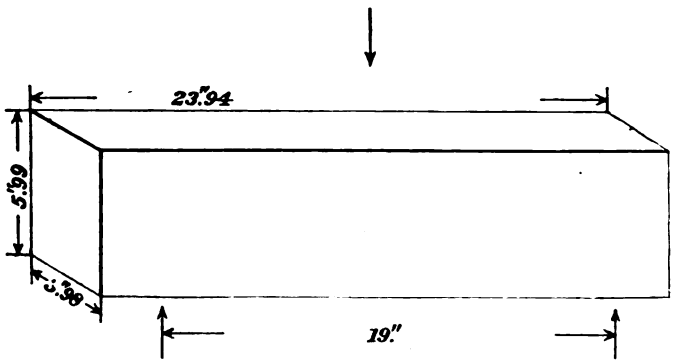
Length, 23″.94.
Sectional area, 5″.99 × 3″.98=23.84 square inches.
Gauged length, 20″.

Applied loads.		In guaged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,384	100	0.	0.	Initial load.
4,768	200	.0005	.....	
9,536	400	.0016	.....	
14,304	600	.0030	.....	
19,072	800	.0045	.....	
23,840	1,000	.0057	.0011	
33,376	1,400	.0078	.....	
42,912	1,800	.0095	.....	
52,448	2,200	.0109	.....	E=6,557,000.
61,984	2,600	.0122	.....	
71,520	3,000	.0135	.0028	
81,056	3,400	.0146	.....	
90,592	3,800	.0157	.....	
100,128	4,200	.0167	.....	E=9,302,000.
109,664	4,600	.0180	.....	
119,200	5,000	.0190	.0040	
128,736	5,400	.0201	.....	
138,272	5,800	.0211	.....	
147,808	6,200	.0222	.....	E=8,333,000.
157,344	6,600	.0235	.....	
166,880	7,000	.0247	.....	
119,200	5,000	.0208	.....	
71,520	3,000	.0183	.....	
23,840	1,000	.0106	.0049	
23,840	1,000	.0087	.....	
71,520	3,000	.0150	.....	
119,200	5,000	.0200	.....	E=7,018,000.
166,880	7,000	.0249	.....	
176,416	7,400	.0260	.....	
185,952	7,800	.0274	.....	
195,488	8,200	.0288	.....	
205,024	8,600	.0305	.....	
214,560	9,000	.0323	.....	
166,880	7,000	.0285	.....	
119,200	5,000	.0243	.....	
71,520	3,000	.0195	.....	
23,840	1,000	.0132	.0068	
23,840	1,000	.0110	.....	
71,520	3,000	.0176	.....	
119,200	5,000	.0228	.....	
166,880	7,000	.0276	.....	
119,200	5,000	.0236	.....	
71,520	3,000	.0190	.....	
23,840	1,000	.0130	.0070	Test discontinued.

No. 5003*b*.

VERMONT MARBLE.

TRANSVERSE TEST.



Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.		*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0007	.0007	.....	
1,500	.....	.0017	.0010	.....	
2,000	.....	.0029	.0012	.....	
2,500	.....	.0040	.0011	.0016	
3,000	.....	.0050	.0010	.....	
3,500	.....	.0060	.0010	.....	
4,000	.....	.0070	.0010	.....	
4,500	.....	.0083	.0013	.....	
5,000	998	.0096	.0013	.0035	Ultimate strength.

Five thousand pounds total load was applied and released. The second application of this load caused rupture of the stone.

No. 5004*a*.

LEE MARBLE.

COMPRESSION TEST.

Length, 23″.97.
Sectional area, 6″ × 3″.97 = 23.82 square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,382	100	0.	0.	Initial load.
4,764	200	.0006	.....	
9,528	400	.0019	.....	
14,292	600	.0030	.....	
19,056	800	.0041	.....	
23,820	1,000	.0051	.0011	
28,584	1,200	.0059	.....	
33,348	1,400	.0067	.....	
38,112	1,600	.0074	.....	E = 6,667,000.
42,876	1,800	.0080	.....	
47,640	2,000	.0085	.0015	
57,168	2,400	.0094	.....	
66,696	2,800	.0103	.....	
76,224	3,200	.0113	.....	E = 10,256,000.
85,752	3,600	.0119	.....	
95,280	4,000	.0126	.0017	
104,808	4,400	.0132	.....	
114,336	4,800	.0140	.....	
123,864	5,200	.0146	.....	E = 11,765,000.
133,392	5,600	.0153	.....	
142,920	6,000	.0161	.....	
95,280	4,000	.0129	.....	
47,640	2,000	.0090	.....	
23,820	1,000	.0063	.0018	
23,820	1,000	.0050	.....	
47,640	2,000	.0080	.....	
95,280	4,000	.0124	.....	E = 11,429,000.
142,920	6,000	.0159	.....	
152,448	6,400	.0164	.....	
161,976	6,800	.0173	.....	
171,504	7,200	.0179	.....	
181,032	7,600	.0185	.....	
190,560	8,000	.0192	.0014	
200,088	8,400	.0197	.....	
209,616	8,800	.0202	.....	
219,144	9,200	.0207	.....	E = 11,765,000.
228,672	9,600	.0216	.....	
238,200	10,000	.0224	.....	
190,560	8,000	.0194	.....	
142,920	6,000	.0161	.....	
95,280	4,000	.0127	.....	
47,640	2,000	.0087	.....	
23,820	1,000	.0058	.0012	
23,820	1,000	.0046	.....	
47,640	2,000	.0076	.....	
95,280	4,000	.0119	.....	
142,920	6,000	.0155	.....	
190,560	8,000	.0189	.....	
238,200	10,000	.0221	.....	
190,560	8,000	.0191	.....	
142,920	6,000	.0159	.....	E=12,903,000.
95,280	4,000	.0125	.....	
47,640	2,000	.0085	.....	
23,820	1,000	.0058	.0013	
142,920	6,000	.0154	.....	Load left on stone over night.
114,300	4,798	.....	.....	Load on stone in the morning after 15 hours' rest.
114,336	4,800	.0134	.0009	
142,920	6,000	.0152	.....	
190,560	8,000	.0186	.....	
238,200	10,000	.0219	.....	
247,728	10,400	.0225	.....	
257,256	10,800	.0231	.....	
266,784	11,200	.0238	.....	
276,312	11,600	.0245	.....	
285,840	12,000	.0252	.....	

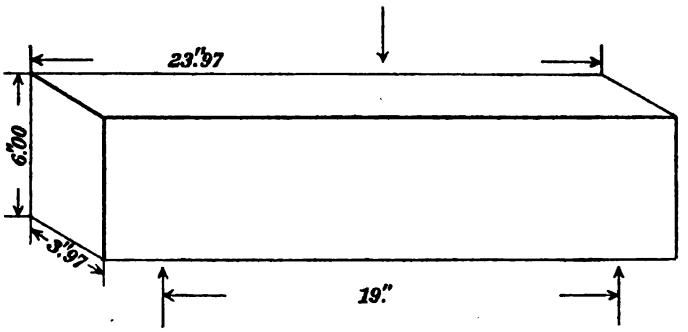
No. 5004*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
295, 368	12, 400	.0250	.....	
304, 896	12, 800	.0264	.....	
314, 424	13, 200	.0272	.....	
323, 952	13, 600	.0279	.....	
333, 480	14, 000	.0285	.....	
238, 200	10, 000	.0227	.....	
142, 920	6, 000	.0162	.....	
47, 640	2, 000	.0085	.....	E = 12,500,000.
23, 820	1, 000	.0057	.0011	
23, 820	1, 000	.0044	.....	
47, 640	2, 000	.0074	.....	
142, 920	6, 000	.0155	.....	
238, 200	10, 000	.0223	.....	
142, 920	6, 000	.0160	.....	
238, 200	10, 000	.0224	.....	
333, 480	14, 000	.0286	.....	
343, 008	14, 400	.0292	.....	
352, 536	14, 800	.0300	.....	
362, 064	15, 200	.0308	.....	E = 11,765,000.
371, 592	15, 600	.0316	.....	
381, 120	16, 000	.0324	.....	
333, 480	14, 000	.0294	.....	
238, 200	10, 000	.0234	.....	
142, 920	6, 000	.0169	.....	
47, 640	2, 000	.0089	.....	
23, 820	1, 000	.0061	.0015	
23, 820	1, 000	.0049	.....	
47, 640	2, 000	.0079	.....	
142, 920	6, 000	.0161	.....	
23, 820	1, 000	.0229	.....	
333, 480	14, 000	.0291	.0015	Test discontinued.

No. 5004*b*.

LEE MARBLE.

TRANSVERSE TEST.



Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.		*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0006	.0006	.....	
1,500	.....	.0015	.0009	.....	
2,000	.....	.0022	.0007	.....	
2,500	.....	.0032	.0010	.0010	
3,000	.....	.0037	.0005	.....	
3,500	.....	.0046	.0009	.....	
4,000	.....	.0053	.0007	.....	
4,500	.....	.0059	.0006	.....	
5,000	.....	.0067	.0008	.0019	
5,500	.....	.0076	.0009	.....	
6,000	.....	.0082	.0006	.....	
6,500	.....	.0090	.0008	.....	
7,000	.....	.0097	.0007	.....	
7,500	.....	.0107	.0010	.0031	
7,940	1,584	.....	.....	.....	Ultimate strength.

No. 5005*a*.

POTOMAC RED SANDSTONE.

COMPRESSION TEST.

Length, 24″.01.
Sectional area, 6″.01 × 4″.02 = 24.16 square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,416	100	0.	0.	Initial load.
4,832	200	.0005	.....	
9,664	400	.0015	.....	
14,496	600	.0030	.....	
19,328	800	.0045	.....	
24,160	1,000	.0060	.0010	
33,824	1,400	.0090	.....	
43,488	1,800	.0115	.....	
53,152	2,200	.0138	.....	E = 3,883,000.
62,816	2,600	.0160	.....	
72,480	3,000	.0182	.0029	
82,144	3,400	.0202	.....	
91,808	3,800	.0220	.....	
101,472	4,200	.0240	.....	E = 4,706,000.
111,136	4,600	.0258	.....	
120,800	5,000	.0277	.0039	
130,464	5,400	.0295	.....	
140,128	5,800	.0312	.....	
149,792	6,200	.0330	.....	E = 5,000,000.
159,456	6,600	.0346	.....	
169,120	7,000	.0365	.....	
120,800	5,000	.0295	.....	
72,480	3,000	.0217	.....	
24,160	1,000	.0116	.0047	
24,160	1,000	.0095	.....	
72,480	3,000	.0197	.....	
120,800	5,000	.0283	.....	
169,120	7,000	.0364	.....	E = 5,195,000.
178,784	7,400	.0380	.....	
188,448	7,800	.0396	.....	
198,112	8,200	.0412	.....	
207,776	8,600	.0430	.....	
217,440	9,000	.0448	.....	
169,120	7,000	.0380	.....	
120,800	5,000	.0368	.....	
72,480	3,000	.0227	.....	
24,160	1,000	.0125	.0053	
24,160	1,000	.0099	.....	
72,480	3,000	.0202	.....	
120,800	5,000	.0289	.....	
169,120	7,000	.0370	.....	E = 5,263,000.
217,440	9,000	.0449	.....	
227,104	9,400	.0465	.....	
236,768	9,800	.0482	.....	
246,432	10,200	.0499	.....	
256,096	10,600	.0515	.....	
265,760	11,000	.0531	.....	
217,440	9,000	.0467	.....	
169,120	7,000	.0398	.....	
120,800	5,000	.0314	.....	
72,480	3,000	.0239	.....	
24,160	1,000	.0143	.0060	
24,160	1,000	.0105	.....	
72,480	3,000	.0210	.....	
120,800	5,000	.0297	.....	
169,120	7,000	.0368	.....	
217,440	9,000	.0457	.....	
265,760	11,000	.0535	.....	
217,440	9,000	.0472	.....	E = 5,000,000.
169,120	7,000	.0402	.....	Load left on stone Saturday night.
150,000	6,210	.....	.....	Load found on stone Monday morning, after 40 hours' rest.
149,792	6,200	.0360	.....	
120,800	5,000	.0325	.....	

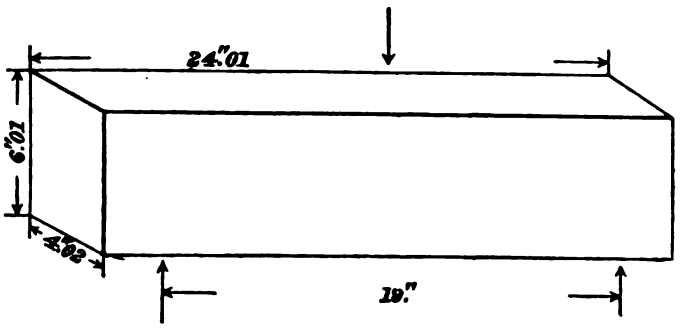
No. 5005*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
72,480	3,000	.0241	.....	
24,160	1,000	.0136	.0063	
265,760	11,000	.0536	.....	
275,424	11,400	.0550	.....	
285,088	11,800	.0566	.....	
294,752	12,200	.0582	.....	
304,416	12,600	.0600	.....	
314,080	13,000	.0619	.....	
265,760	11,000	.0555	.....	
217,440	9,000	.0489	.....	
169,120	7,000	.0415	.....	
120,800	5,000	.0337	.....	
72,480	3,000	.0249	.....	
24,160	1,000	.0142	.0068	
24,160	1,000	.0114	.....	
72,480	3,000	.0219	.....	
120,800	5,000	.0307	.....	
169,120	7,000	.0389	.....	
217,440	9,000	.0468	.....	
265,760	11,000	.0545	.....	
314,080	13,000	.0623	.....	
265,760	11,000	.0560	.....	
217,440	9,000	.0492	.....	
169,120	7,000	.0419	.....	
120,800	5,000	.0340	.....	
72,480	3,000	.0252	.....	
24,160	1,000	.0143	.0070	
24,160	1,000	.0117	.....	
72,480	3,000	.0232	.....	
120,800	5,000	.0312	.....	
169,120	7,000	.0392	.....	
120,800	5,000	.0322	.....	
72,480	3,000	.0243	.....	
24,160	1,000	.0141	.0070	
24,160	1,000	.0118	.....	
72,480	3,000	.0223	.....	
120,800	5,000	.0311	.....	
169,120	7,000	.0394	.....	
217,440	9,000	.0472	.....	
265,760	11,000	.0550	.....	
217,440	9,000	.0485	.....	
169,120	7,000	.0413	.....	
217,440	9,000	.0482	.....	
265,760	11,000	.0549	.....	
217,440	9,000	.0485	.....	
169,120	7,000	.0415	.....	
217,440	9,000	.0482	.....	
265,760	11,000	.0550	.....	
217,440	9,000	.0485	.....	
169,120	7,000	.0415	.....	
120,800	5,000	.0340	.....	
72,480	3,000	.0253	.....	
24,160	1,000	.0145	.0071	Test discontinued.

No. 5005*b*.

POTOMAC RED SANDSTONE.

TRANSVERSE TEST.

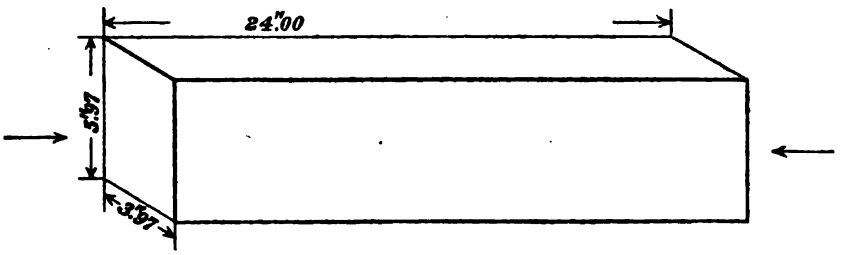


Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.		*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0005	.0005	.....	
1,500	.....	.0011	.0006	.....	
2,000	.....	.0018	.0007	.....	
2,500	.....	.0026	.0008	.0007	
3,000	.....	.0034	.0008	.....	
3,500	.....	.0042	.0008	.....	
4,000	.....	.0050	.0008	.....	
4,500	.....	.0058	.0008	.....	
5,000	.....	.0067	.0009	.0021	
5,500	.....	.0076	.0009	.....	
6,000	.....	.0084	.0008	.....	
6,500	.....	.0091	.0007	.....	
7,000	.....	.0100	.0009	.....	
7,500	.....	.0107	.0007	.....	
8,000	.....	.0117	.0010	.....	
8,500	.....	.0126	.0009	.....	
9,000	.....	.0133	.0007	.....	
9,500	.....	.0141	.0008	.....	
10,000	.....	.0150	.0009	.0046	
10,500	.....	.0159	.0009	.....	
11,000	.....	.0167	.0008	.....	
11,500	.....	.0177	.0010	.....	
11,820	2,320	.....	.....	.....	Ultimate strength.

No. 5006*a*.

PORTLAND RED SANDSTONE.

COMPRESSION TEST.



Sectional area, 23.70 square inches.
Gauged length, 20″.

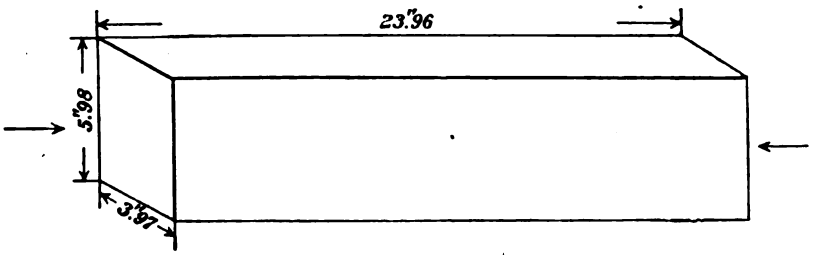
Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,370	100	0.	0.	Initial load.
4,740	200	.0012	.....	
9,480	400	.0048	.....	
14,220	600	.0080	.....	
18,960	800	.0107	.....	
23,700	1,000	.0133	.0052	
33,180	1,400	.0177	.....	E=2,740,000.
42,660	1,800	.0220	.....	
52,140	2,200	.0257	.....	
61,620	2,600	.0298	.....	
71,100	3,000	.0335	.0108	
80,580	3,400	.0374	.....	E=2,703,000.
90,060	3,800	.0411	.....	
99,540	4,200	.0445	.....	
109,020	4,600	.0482	.....	
118,500	5,000	.0520	.0145	
127,980	5,400	.0566	.....	
137,460	5,800	.0606	.....	
146,300	6,173	.....	.....	Ultimate strength.

Oblique longitudinal fractures separating stone into wedge-shaped fragments.

No. 5007*a*.

OHIO SANDSTONE.

COMPRESSION TEST.



Sectional area, 23.74 square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,374	100	0.	0.	Initial load.
4,748	200	.0016	.....	
9,496	400	.0053	.....	
14,244	600	.0097	.....	
18,992	800	.0137	.0024	
23,740	1,000	.0174	.0035	
28,488	1,200	.0205	.....	
33,236	1,400	.0231	.0046	
37,984	1,600	.0258	.....	E = 1,887,000.
42,732	1,800	.0280	.0052	
47,480	2,000	.0303	.....	
42,732	1,800	.0288	.....	
37,984	1,600	.0273	.....	
33,236	1,400	.0255	.....	
28,488	1,200	.0238	.....	
23,740	1,000	.0216	.....	
18,992	800	.0194	.....	
14,244	600	.0167	.....	
9,496	400	.0134	.....	
4,748	200	.0090	.0058	
4,748	200	.0075	.....	
9,496	400	.0110	.....	
14,244	600	.0143	.....	
18,992	800	.0172	.....	
23,740	1,000	.0197	.....	E = 2,353,000.
28,488	1,200	.0220	.....	
33,236	1,400	.0241	.....	
37,984	1,600	.0262	.....	
42,732	1,800	.0282	.....	
47,480	2,000	.0301	.....	
20,000	840	.....	.....	Rested under this load 15 hours.
23,740	1,000	.0205	.....	
47,480	2,000	.0298	.....	
52,228	2,200	.0318	.0060	
56,976	2,400	.0342	.....	
61,724	2,600	.0360	.0068	
66,472	2,800	.0384	.....	
71,220	3,000	.0403	.0073	
71,220	3,000	.0407	.....	
75,968	3,200	.0425	.....	
80,716	3,400	.0442	.....	
85,464	3,600	.0462	.....	E = 2,128,000.
90,212	3,800	.0482	.....	
94,960	4,000	.0503	.....	
71,220	3,000	.0435	.....	
47,480	2,000	.0354	.....	
23,740	1,000	.0252	.0079	
23,740	1,000	.0222	.....	
47,480	2,000	.0327	.....	

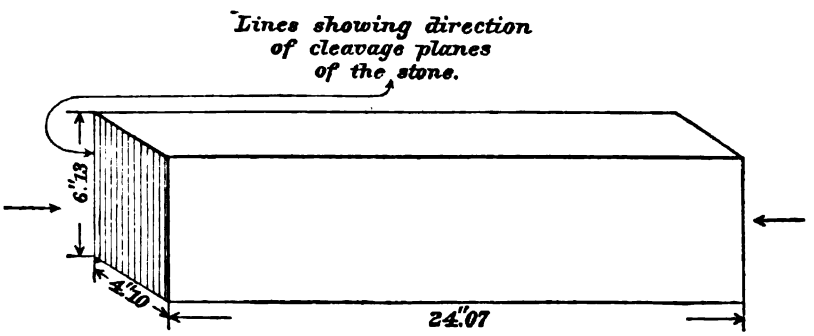
No. 5007*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
71,220	3,000	.0418	.....	E = 1,980,000.
94,960	4,000	.0509	.....	
99,708	4,200	.0527	.....	
104,456	4,400	.0548	.....	
109,204	4,600	.0568	.....	
113,952	4,800	.0589	.....	
118,700	5,000	.0614	.....	
94,960	4,000	.0548	.....	
71,220	3,000	.0470	.....	
47,480	2,000	.0382	.....	
23,740	1,000	.0270	.0089	
23,740	1,000	.0233	.....	
47,480	2,000	.0345	.....	
71,220	3,000	.0440	.....	
94,960	4,000	.0530	.....	
118,700	5,000	.0022	.....	
123,448	5,200	.0649	.....	
128,196	5,400	.0673	.....	
132,944	5,600	.0703	.....	
137,692	5,800	.0748	.....	
138,500	5,834	.....	.....	Ultimate strength.

No. 5008*a*.

MONSON (ME.) SLATE.

COMPRESSION TEST.



Sectional area, 25.13 square inch.
Ganged length, 20″.

Applied loads.		In ganged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,513	100	0.	0.	Initial load.
5,026	200	.0001	.....	
10,052	400	.0003	.....	
15,078	600	.0006	.....	
20,104	800	.0009	.....	
25,130	1,000	.0011	.0002	
50,260	2,000	.0018	.....	
75,390	3,000	.0026	.....	
100,520	4,000	.0037	0.	
125,650	5,000	.0050	.....	E = 12,500,000.
150,700	6,000	.0067	.....	Snapping sounds.
175,830	7,000	.0086	.0001	Longitudinal cracks opened.
200,960	8,000	.0109	.0001	E = 8,696,000.
208,900	8,313	.....	.....	Ultimate strength.

Failed by opening longitudinal seams following cleavage planes of the stone.

No. 5009*a*.

NORTH RIVER BLUESTONE.

COMPRESSION TEST.

Length, 23″.98.
Sectional area, 6″ × 4″ = 24″ square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,400	100	0.	0.	Initial load.
4,800	200	.0001	.....	
9,600	400	.0006	.....	
14,400	600	.0012	.....	E = 7,500,000.
19,200	800	.0020	.....	
24,000	1,000	.0027	.0003	
33,600	1,400	.0045	.....	
43,200	1,800	.0065	.....	
52,800	2,200	.0085	.....	E = 4,651,000.
62,400	2,600	.0108	.....	
72,000	3,000	.0129	.0019	
81,600	3,400	.0150	.....	
91,200	3,800	.0170	.....	
100,800	4,200	.0190	.....	E = 4,444,000.
110,400	4,600	.0210	.....	
120,000	5,000	.0230	.0030	
129,600	5,400	.0249	.....	
139,200	5,800	.0265	.....	
148,800	6,200	.0281	.....	E = 5,405,000.
158,400	6,600	.0300	.....	
168,000	7,000	.0315	.0041	
177,600	7,400	.0332	.....	
187,200	7,800	.0347	.....	
196,800	8,200	.0360	.....	E = 6,153,000.
206,400	8,600	.0375	.....	
216,000	9,000	.0389	.0050	
225,600	9,400	.0403	.....	
235,200	9,800	.0415	.....	
244,800	10,200	.0428	.....	E = 7,273,000.
254,400	10,600	.0439	.....	
264,000	11,000	.0450	.....	
216,000	9,000	.0407	.....	
168,000	7,000	.0357	.....	
120,000	5,000	.0297	.....	
72,000	3,000	.0219	.....	
24,000	1,000	.0110	.0056	
24,000	1,000	.0084	.....	
72,000	3,000	.0170	.....	
120,000	5,000	.0260	.....	
168,000	7,000	.0335	.....	
216,000	9,000	.0398	.....	E = 7,017,000.
264,000	11,000	.0453	.....	
216,000	9,000	.0410	.....	
168,000	7,000	.0359	.....	
216,000	9,000	.0406	.....	
264,000	11,000	.0455	.0057	
273,600	11,400	.0467	.....	
283,200	11,800	.0478	.....	
292,800	12,200	.0488	.....	
302,400	12,600	.0499	.....	
312,000	13,000	.0510	.0059	
321,600	13,400	.0523	.....	
331,200	13,800	.0535	.....	
340,800	14,200	.0544	.....	
350,400	14,600	.0555	.....	
360,000	15,000	.0565	.....	
312,000	13,000	.0524	.....	
264,000	11,000	.0480	.....	
216,000	9,000	.0433	.....	
168,000	7,000	.0380	.....	E = 8,696,000.
120,000	5,000	.0318	.....	
72,000	3,000	.0235	.....	
24,000	1,000	.0122	.0064	

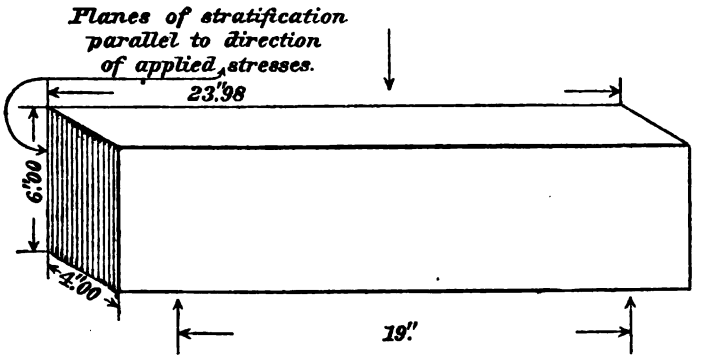
No. 5009*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
24,000	1,000	.0092		
72,000	3,000	.0180		
120,000	5,000	.0270		
168,000	7,000	.0345		
216,000	9,000	.0410		
360,000	15,000	.0567		
264,000	11,000	.0480		Rested under this load over night—15 hours.
240,000				Load on stone in the morning.
216,000	9,000	.0436		
168,000	7,000	.0385		
120,000	5,000	.0322		
72,000	3,000	.0241		
24,000	1,000	.0129	.0070	
24,000	1,000	.0098		
72,000	3,000	.0185		E=8,163,000.
120,000	5,000	.0274		
168,000	7,000	.0350		
216,000	9,000	.0412		
264,000	11,000	.0467		
273,600	13,000	.0517		
360,000	15,000	.0565		
369,600	15,400	.0575		
379,200	15,800	.0584		
388,800	16,200	.0593		
398,400	16,600	.0603		
408,000	17,000	.0614		
360,000	15,000	.0572		
312,000	13,000	.0530		
264,000	11,000	.0485		
216,000	9,000	.0438		
168,000	7,000	.0385		
120,000	5,000	.0321		
72,000	3,000	.0238		
24,000	1,000	.0125	.0068	
24,000	1,000	.0093		
72,000	3,000	.0184		
120,000	5,000	.0275		E=8,163,000.
168,000	7,000	.0350		
216,000	9,000	.0415		
264,000	11,000	.0469		
312,000	13,000	.0519		
360,000	15,000	.0568		
408,000	17,000	.0617		
417,600	17,400	.0630		
427,200	17,800	.0640		
436,800	18,200	.0648		
446,400	18,600	.0657		
456,000	19,000	.0666		
408,000	17,000	.0628		
360,000	15,000	.0585		
312,000	13,000	.0541		
264,000	11,000	.0495		
216,000	9,000	.0447		
168,000	7,000	.0392		
120,000	5,000	.0329		
72,000	3,000	.0243		
24,000	1,000	.0129	.0071	
24,000	1,000	.0099		
72,000	3,000	.0187		
120,000	5,000	.0279		
168,000	7,000	.0355		
216,000	9,000	.0420		
264,000	11,000	.0475		
312,000	13,000	.0523		
360,000	15,000	.0573		
408,000	17,000	.0620		
456,000	19,000	.0667	.0069	Test discontinued.

No. 5009*b*.

NORTH RIVER BLUESTONE.

TRANSVERSE TEST.



Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0005	.0005	.....	
1,500	.....	.0010	.0005	.....	
2,000	.....	.0015	.0005	.....	
2,500	.....	.0018	.0003	.0003	
3,000	.....	.0022	.0004	.....	
3,500	.....	.0026	.0004	.....	
4,000	.....	.0030	.0004	.....	
4,500	.....	.0034	.0004	.....	
5,000	.....	.0037	.0003	.0008	
5,500	.....	.0041	.0004	.....	
6,000	.....	.0044	.0003	.....	
6,500	.....	.0048	.0004	.....	
7,000	.....	.0051	.0003	.....	
7,500	.....	.0055	.0004	.0010	
8,000	.....	.0060	.0005	.....	
8,500	.....	.0063	.0003	.....	
9,000	.....	.0066	.0003	.....	
9,500	.....	.0070	.0004	.....	
10,000	.....	.0073	.0003	.0015	
10,500	.....	.0077	.0004	.....	
11,000	.....	.0081	.0004	.....	
11,500	.....	.0085	.0004	.....	
12,000	.....	.0088	.0003	.....	
12,500	.....	.0092	.0004	.0020	
13,000	.....	.0096	.0004	.....	
13,500	.....	.0099	.0003	.....	
14,000	.....	.0103	.0004	.....	
14,500	.....	.0107	.0004	.....	
15,000	.....	.0112	.0005	.0024	
15,500	.....	.0117	.0005	.....	
16,000	.....	.0120	.0003	.....	
16,500	.....	.0125	.0005	.....	
17,000	.....	.0129	.0004	.....	
17,500	.....	.0133	.0004	.0030	
18,000	.....	.0136	.0003	.....	
19,000	.....	.0143	.0007	.....	
19,500	.....	.0147	.0004	.....	
20,000	.....	.0151	.0004	.0035	
20,500	.....	.0158	.0007	.....	
21,000	.....	.0163	.0005	.....	
21,500	.....	.0167	.0004	.....	
22,000	.....	.0171	.0004	.....	
22,400	4,433	.....	.....	.....	Ultimate strength.

No. 5010*a*.

WORCESTER GRANITE.

COMPRESSION TEST.

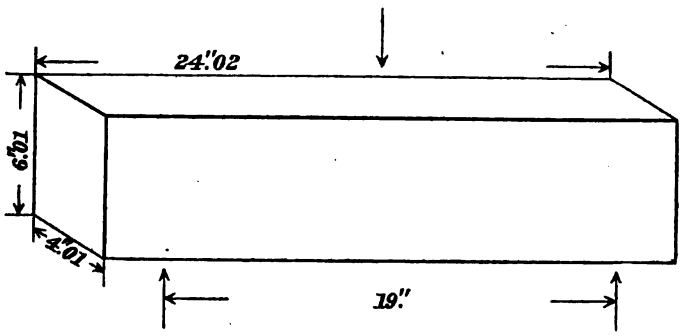
Length, 24″.02.
Sectional area 6″.01 × 4″.01 = 24.1 square inches.
Gauged length 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,410	100	0.	0.	Initial load.
4,820	200	.0005	.....	
9,640	400	.0016	.....	
14,460	600	.0025	.....	
19,280	800	.0034	.....	
24,100	1,000	.0042	.0010	
33,740	1,400	.0055	.....	
43,380	1,800	.0068	.....	
53,020	2,200	.0080	.....	E = 7,547,000.
62,660	2,600	.0090	.....	
72,300	3,000	.0101	.0016	
81,940	3,400	.0111	.....	
91,580	3,800	.0121	.....	E = 8,511,000.
101,220	4,200	.0129	.....	Cracks at one corner.
110,860	4,600	.0140	.....	
120,500	5,000	.0150	.0018	
130,140	5,400	.0158	.....	
139,780	5,800	.0168	.....	
149,420	6,200	.0177	.....	E = 8,696,000.
159,060	6,600	.0187	.....	
168,700	7,000	.0199	.....	
120,500	5,000	.0157	.....	
72,300	3,000	.0112	.....	
24,100	1,000	.0058	.0021	
24,100	1,000	.0050	.....	
72,300	3,000	.0103	.....	
120,500	5,000	.0150	.....	
168,700	7,000	.0197	.....	E = 8,889,000.
178,340	7,400	.0207	.....	
187,980	7,800	.0217	.....	
197,620	8,200	.0225	.....	
207,260	8,600	.0233	.....	
216,900	9,000	.0243	.....	Pieces flaked off edges at one end.
168,700	7,000	.0203	.....	
120,500	5,000	.0160	.....	
72,300	3,000	.0116	.....	
24,100	1,000	.0060	.0020	
24,100	1,000	.0050	.....	
72,300	3,000	.0106	.....	
120,500	5,000	.0155	.....	
168,700	7,000	.0200	.....	
216,900	9,000	.0242	.0022	Test discontinued.

No. 5010*b*.

WORCESTER GRANITE.

TRANSVERSE TEST.



Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.		*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0008	.0008	.....	
1,500	.....	.0016	.0008	.....	
2,000	.....	.0022	.0006	.....	
2,500	.....	.0022	.0006	.0008	
3,000	.....	.0035	.0007	.....	
3,500	.....	.0040	.0005	.....	
4,000	.....	.0046	.0006	.....	
4,500	.....	.0051	.0005	.....	
5,000	.....	.0057	.0006	.0014	
5,500	.....	.0062	.0005	.....	
6,000	.....	.0067	.0005	.....	
6,500	.....	.0072	.0005	.....	
7,000	.....	.0077	.0005	.....	
7,500	.....	.0083	.0006	.0019	
8,000	.....	.0088	.0005	.....	
8,500	.....	.0093	.0005	.....	
9,000	.....	.0098	.0005	.....	
9,500	.....	.0103	.0005	.....	
10,000	.....	.0108	.0005	.....	
10,560	2,066	.0117	.0009	.....	Ultimate strength.

Sustained maximum load ½ minute, then fractured.

No. 5011*a*.

QUINCY GRANITE.

COMPRESSION TEST.

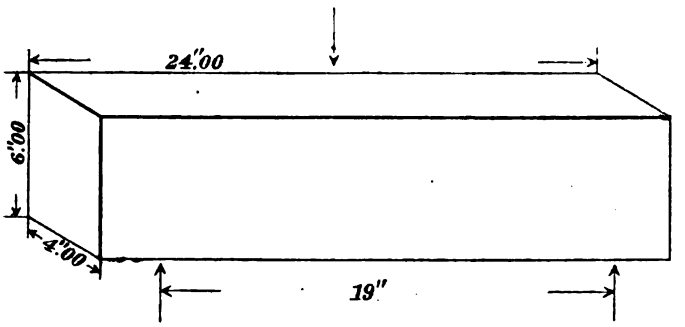
Length, 24″.
Sectional area, 4″ × 6 = 24 square inches.
Gauged length, 20″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,400	100	0.	0.	Initial load.
4,800	200	.0003	.....	
9,600	400	.0012	.....	
14,400	600	.0022	.....	
19,200	800	.0031	.....	
24,000	1,000	.0040	.0008	
33,600	1,400	.0056	.....	
43,200	1,800	.0068	.....	
52,800	2,200	.0081	.....	E=6,776,000.
62,400	2,600	.0091	.....	
72,000	3,000	.0103	.0012	
81,600	3,400	.0110	.....	
91,200	3,800	.0122	.....	
100,800	4,200	.0132	.....	E=8,696,000.
110,400	4,600	.0142	.....	
120,000	5,000	.0152	.0015	
129,600	5,400	.0163	.....	
139,200	5,800	.0173	.....	
148,800	6,200	.0183	.....	E=8,333,000.
158,400	6,600	.0193	.....	
168,000	7,000	.0203	.0018	
177,600	7,400	.0211	.....	
187,200	7,800	.0221	.....	
196,800	8,200	.0230	.....	E=10,526,000.
206,400	8,600	.0238	.....	
216,000	9,000	.0248	.0025	Snapping sounds.
225,600	9,400	.0261	.....	Snapping sounds repeated.
235,200	9,800	.0268	.0026	E=8,889,000.
244,800	10,200	.0278	.....	
254,400	10,600	.0286	.....	
264,000	11,000	.0296	.0028	
273,600	11,400	.0305	.....	
283,200	11,800	.0315	.....	
292,800	12,200	.0323	.....	E=10,000,000.
302,400	12,600	.0333	.....	
312,000	13,000	.0339	.....	Small pieces flaked off at two corners.
264,000	11,000	.0303	.....	
216,000	9,000	.0263	.....	
168,000	7,000	.0220	.....	
120,000	5,000	.0177	.....	
72,000	3,000	.0128	.....	
24,000	1,000	.0069	.0031	
24,000	1,000	.0060	.....	
72,000	3,000	.0119	.....	
120,000	5,000	.0168	.....	
168,000	7,000	.0213	.....	
216,000	9,000	.0256	.....	
264,000	11,000	.0298	.....	
312,000	13,000	.0343	.0033	Test discontinued.

No. 5011*b*.

QUINCY GRANITE.

TRANSVERSE TEST.



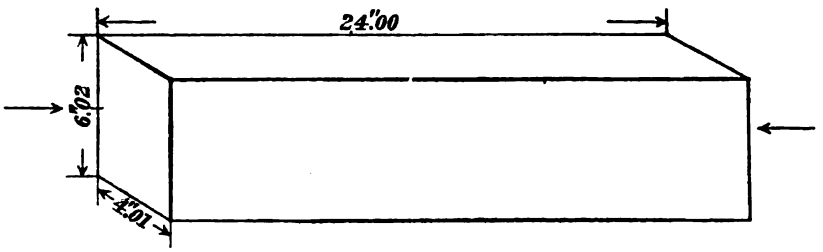
Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.		*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0006	.0006	.....	
1,500	.....	.0015	.0009	.....	
2,000	.....	.0022	.0007	.....	
2,500	.....	.0030	.0008	.0007	
3,000	.....	.0040	.0010	.....	
3,500	.....	.0046	.0006	.....	
4,000	.....	.0051	.0005	.....	
4,500	.....	.0058	.0007	.....	
5,000	.....	.0065	.0007	.0015	
5,500	.....	.0070	.0005	.....	
6,000	.....	.0076	.0006	.....	
6,500	.....	.0082	.0006	.....	
7,000	.....	.0087	.0005	.....	
7,500	.....	.0092	.0005	.0019	
8,000	.....	.0098	.0006	.....	
8,500	.....	.0103	.0005	.....	
9,000	.....	.0108	.0005	.....	
9,500	.....	.0118	.0005	.....	
10,000	1,979	.....	.....	.....	Ultimate strength.

Sustained maximum load momentarily, then fractured.

No. 5012*a*.

CAPE ANN GRANITE.

COMPRESSION TEST.



Sectional area, 24".14.
Gauged length, 19".93.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,414	100	0.	0.	Initial load.
4,828	200	.0006	.....	
9,656	400	.0016	.....	
14,484	600	.0025	.....	
19,312	800	.0034	.....	
24,140	1,000	.0043	.0005	
36,210	1,500	.0063	.....	E=6,477,000.
60,350	2,500	.0097	.0008	
72,420	3,000	.0111	.....	
84,490	3,500	.0126	.....	
72,420	3,000	.0115	.....	
60,350	2,500	.0101	.....	
36,210	1,500	.0073	.....	
24,140	1,000	.0055	.....	
12,070	500	.0035	.0011	
12,070	500	.0030	.....	
24,140	1,000	.0050	.....	E=6,944,000.
36,210	1,500	.0067	.....	
60,350	2,500	.0098	.....	
72,420	3,000	.0112	.....	
84,490	3,500	.0127	.....	
96,560	4,000	.0140	.....	
108,630	4,500	.0155	.....	
120,700	5,000	.0170	.....	
108,630	4,500	.0158	.....	
96,560	4,000	.0146	.....	
84,490	3,500	.0133	.....	
72,420	3,000	.0120	.....	
60,350	2,500	.0108	.....	
48,280	2,000	.0093	.....	
36,210	1,500	.0078	.....	
24,140	1,000	.0060	.....	
12,070	500	.0037	.0012	
12,070	500	.0032	.....	
24,140	1,000	.0052	.....	
36,210	1,500	.0071	.....	E=8,197,000
48,280	2,000	.0087	.....	
60,350	2,500	.0102	.....	
72,420	3,000	.0116	.....	
84,490	3,500	.0130	.....	
96,560	4,000	.0143	.....	
108,630	4,500	.0157	.....	
120,700	5,000	.0170	.....	
132,770	5,500	.0182	.....	
144,840	6,000	.0195	.....	
156,910	6,500	.0209	.....	
168,980	7,000	.0220	.....	
181,050	7,500	.0233	.....	
193,120	8,000	.0246	.....	

No. 5012*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
168,960	7,000	.0225	.....	
144,840	6,000	.0202	.....	
120,700	5,000	.0180	.....	
96,560	4,000	.0155	.....	
72,420	3,000	.0128	.....	
48,280	2,000	.0100	.....	
24,140	1,000	.0063	.0015	
24,140	1,000	.0055	.....	
48,280	2,000	.0090	.....	
72,420	3,000	.0120	.....	
96,560	4,000	.0147	.....	E=8,386,000.
120,700	5,000	.0173	.....	
144,840	6,000	.0199	.....	
168,980	7,000	.0224	.....	
193,120	8,000	.0246	.....	
205,190	8,500	.0260	.....	
217,260	9,000	.0270	.....	
229,330	9,500	.0283	.....	
241,400	10,000	.0295	.....	
253,470	10,500	.0307	.....	
265,540	11,000	.0319	.....	
277,610	11,500	.0331	.....	
289,680	12,000	.0344	.....	
265,540	11,000	.0323	.....	
241,400	10,000	.0302	.....	
217,260	9,000	.0280	.....	
193,120	8,000	.0258	.....	
168,980	7,000	.0235	.....	
144,840	6,000	.0212	.....	
120,700	5,000	.0188	.....	
96,560	4,000	.0162	.....	
72,420	3,000	.0135	.....	
48,280	2,000	.0103	.....	
24,140	1,000	.0067	.0018	
24,140	1,000	.0056	.....	
48,280	2,000	.0092	.....	E=8,897,000.
72,420	3,000	.0123	.....	
96,560	4,000	.0151	.....	
120,700	5,000	.0178	.....	
144,840	6,000	.0202	.....	
168,980	7,000	.0227	.....	
193,120	8,000	.0252	.....	
217,260	9,000	.0277	.....	
241,400	10,000	.0299	.....	
265,540	11,000	.0322	.....	
289,680	12,000	.0345	.....	
301,750	12,500	.0357	.....	
313,820	13,000	.0368	.....	
325,890	13,500	.0380	.....	
337,960	14,000	.0392	.....	
350,030	14,500	.0402	.....	Cracked at one corner.
313,820	13,000	.0372	.....	
289,680	12,000	.0352	.....	
265,540	11,000	.0330	.....	
241,400	10,000	.0310	.....	
217,260	9,000	.0287	.....	
193,120	8,000	.0265	.....	
168,980	7,000	.0241	.....	
144,840	6,000	.0217	.....	
120,700	5,000	.0192	.....	
96,560	4,000	.0166	.....	
72,420	3,000	.0138	.....	
48,280	2,000	.0106	.....	
24,140	1,000	.0067	.0020	
24,140	1,000	.0058	.....	
48,280	2,000	.0095	.....	
72,420	3,000	.0125	.....	
96,560	4,000	.0153	.....	
120,700	5,000	.0180	.....	
144,840	6,000	.0205	.....	
168,980	7,000	.0230	.....	
193,120	8,000	.0255	.....	
217,260	9,000	.0280	.....	
241,400	10,000	.0302	.....	
265,540	11,000	.0325	.....	
289,680	12,000	.0348	.....	
550,000	22,784	.....	.....	Corners flaked off.

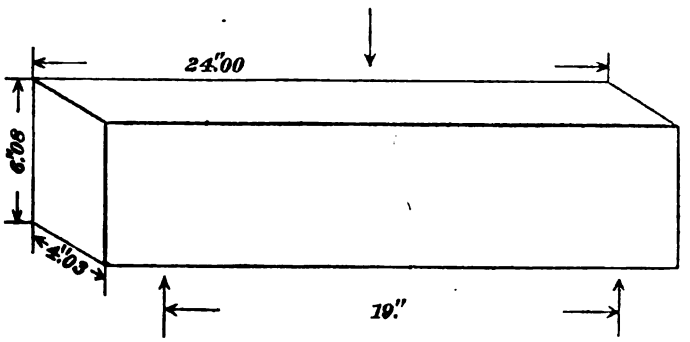
No. 5012*a*—Continued.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
2,414	100	.....	.0035	No allowance made for reduction in sectional area on account of corners flaking off.
48,280	2,000	.0122	.....	
96,560	4,000	.0177	.....	
144,840	6,000	.0232	.....	
193,120	8,000	.0287	.....	
241,400	10,000	.0335	.....	
289,680	12,000	.0383	.....	
241,400	10,000	.0338	.....	
193,120	8,000	.0294	.....	
144,840	6,000	.0242	.....	
96,560	4,000	.0190	.....	
48,280	2,000	.0126	.0035	
289,680	12,000	.0385	.....	
313,820	13,000	.0409	.....	
337,960	14,000	.0432	.....	
362,100	15,000	.0455	.....	
386,240	16,000	.0477	.....	
410,380	17,000	.0502	.....	
434,520	18,000	.0525	.....	
458,660	19,000	.0548	.....	
482,800	20,000	.0567	.....	
458,660	19,000	.0548	.....	
434,520	18,000	.0529	.....	
410,380	17,000	.0510	.....	
386,240	16,000	.0487	.....	
362,100	15,000	.0467	.....	
337,960	14,000	.0448	.....	
313,820	13,000	.0420	.....	
289,680	12,000	.0400	.....	
241,400	10,000	.0353	.....	
193,120	8,000	.0303	.....	
144,840	6,000	.0252	.....	
96,560	4,000	.0195	.....	
48,280	2,000	.0130	.0037	
584,100	24,196	.....	.....	Ultimate strength.

No. 5021.

CAPE ANN GRANITE. SECOND SPECIMEN.

TRANSVERSE TEST.



Applied loads.		Deflections.	Successive deflections.	Deflection sets.	Remarks.
Total.	Maximum fiber stress.				
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	
500	.....	0.	0.	0.	Initial load.
1,000	.....	.0008	.0008	.....	
1,500	.....	.0013	.0005	.....	
2,000	.....	.0018	.0005	.....	
2,500	.....	.0023	.0005	.0005	
3,000	.....	.0027	.0004	.....	
3,500	.....	.0032	.0005	.....	
4,000	.....	.0037	.0005	.....	
4,500	.....	.0040	.0003	.....	
5,000	.....	.0045	.0005	.0010	
5,500	.....	.0049	.0004	.....	
6,000	.....	.0052	.0003	.....	
6,500	.....	.0055	.0003	.....	
7,000	.....	.0059	.0004	.....	
7,500	.....	.0064	.0005	.0012	
8,000	.....	.0070	.0006	.....	
8,500	.....	.0072	.0002	.....	
9,000	.....	.0076	.0004	.....	
9,500	.....	.0080	.0004	.....	
10,000	.....	.0083	.0003	.0016	
10,500	.....	.0088	.0005	.....	
11,000	.....	.0093	.0005	.....	
11,500	.....	.0097	.0004	.....	
12,000	.....	.0101	.0004	.....	
12,500	2,392	.....	.....	.....	Ultimate strength.

TABULATION OF COMPRESSION AND TRANSVERSE TESTS OF STONES.

Compression tests.								Transverse tests.				
Number of test.	Name of stone.	Dimensions.			Sectional area.	Maximum load.		Number of test.	Distance between end supports.	Ultimate resistance.	Maximum fiber stress.	Remarks.
		Length.	Breadth.	Depth.		Total.	Per square inch.					
		Inches.	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*		*Inches.*	*Pounds.*		
5001*a*	Hoosier buff Oolitic limestone	24	4	6.03	24.12	99,100	4,109	.....	.....	.....	.....	Ultimate strength.
5002*a*	Indiana limestone	23.98	4.06	6.03	24.48	122,400	5,000	.....	.....	.....	.....	Do.
5003*a*	Vermont marble	23.94	3.98	5.99	23.84	214,560	9,000	5003*b*	19	5,000	998	
5004*a*	Lee marble	23.97	3.97	6	23.82	381,120	16,000	5004*b*	19	7,940	1,584	
5005*a*	Potomac red sandstone	24.01	4.02	6.01	24.16	314,080	13,000	5005*b*	19	11,820	2,320	
5006*a*	Portland red sandstone	24	3.97	5.97	23.70	146,300	6,173	.....	.....	.....	.....	Ultimate strength.
5007*a*	Ohio sandstone	23.96	3.97	5.98	23.74	138,500	5,834	.....	.....	.....	.....	Do.
5008*a*	Monson, Maine, slate	24.07	4.10	6.13	25.13	208,900	8,313	.....	.....	.....	.....	Do.
5009*a*	North River bluestone	23.98	4	6	24	456,000	19,000	5009*b*	19	22,400	4,433	
5010*a*	Worcester granite	24.02	4.01	6.01	24.10	216,900	9,000	5010*b*	19	10,500	2,066	
5011*a*	Quincy granite	24	4	6	24	312,000	13,000	5011*b*	19	10,000	1,979	
5012*a*	Cape Ann granite	24	4.01	6.02	24.14	584,100	24,196	.....	.....	.....	.....	Ultimate strength.
.....	....do	24	4.03	6.08	.....	.....	.....	5021	19	12,500	2,392	Second specimen.*

* Had not been subjected to compression loads.

TENSILE TESTS

OF

LINEN SHOT LINES

FOR

SUPERINTENDENT U. S. LIFE-SAVING SERVICE, WASHINGTON, D. C.

LINES MANUFACTURED FROM SMITH & DOVE'S LINEN SAIL TWINE.

1135

No. 4 SHOT LINES.

Diameter of lines, ".14.
Lay, one turn in ".50.
Three strands of four threads each.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3603	10	13	Inside	360	At middle.
3604	10	12	....do	320	6" from pin.
3605	10	15	....do	315	1 foot from pin.
3606	10	14	....do	405	6" from pin.
3607	10	15	....do	320	At middle.
3608	10	13	....do	340	Do.
3609	10	14	....do	315	1 foot from pin.
3610	10	15	....do	340	Do.
3611	10	13	....do	335	6" from pin.
3612	10	14	....do	355	Do.
3613	10	13	....do	295	At middle.
3614	10	14	....do	305	Do.
3615	10	14	....do	350	6" from pin.
3616	10	15	....do	335	1 foot from pin.
3617	10	14	....do	315	6" from pin.
3618	10	14	....do	290	Do.
3619	10	15	....do	350	1 foot from pin.
3620	10	15	....do	305	6" from pin.
3621	10	14	....do	330	1 foot from pin.
3622	11	1	....do	345	At middle.
3623	10	15	....do	350	6" from pin.
3624	10	14	....do	340	Do.
3625	10	15	....do	330	Do.
3626	10	15	....do	290	1 foot from pin.
3627	10	15	....do	315	At middle.
3628	10	14	Outside	290	6" from pin.
3629	10	14	....do	300	At middle.
3630	10	14	....do	325	1 foot from pin.
3631	10	14	....do	300	At middle.
3632	10	15	....do	295	Do.
3633	10	15	....do	290	1 foot from pin.
3634	10	15	....do	295	Do.
3635	10	15	....do	325	6" from pin.
3636	10	15	....do	300	At middle.
3637	10	15	....do	325	Do.
3638	10	15	....do	300	1 foot from pin.
3639	10	15	....do	295	At middle.
3640	10	15	....do	310	Do.
3641	10	15	....do	280	1 foot from pin.
3642	10	15	....do	250	At pin.
			....do	260	At middle.
3643	10	15	....do	300	Do.
3644	10	15	....do	330	6" from pin.
3645	10	14	....do	310	1 foot from pin.
3646	10	15	....do	290	At pin.
3647	10	14	....do	325	At middle.
3648	10	15	....do	250	Do.
			....do	270	At pin.
3649	10	15	....do	275	Do.
3650	10	15	....do	300	Do.
3651	11	1	....do	325	At middle.
3652	10	14	....do	330	Do.
3653	10	14	....do	300	1 foot from pin.
3654	10	13	....do	290	At pin.
3655	10	14	....do	320	1 foot from pin.
3656	10	14	....do	300	At middle.
3657	10	15	....do	310	1 foot from pin.
3658	11	1	....do	280	At pin.
3659	11	2	....do	305	Do.
3660	11	1	....do	315	At middle.
3661	11	1	....do	325	6" from pin.
3662	11	1	....do	305	1 foot from pin.
3663	10	15	....do	285	At middle.
3664	11	0	....do	305	6" from pin.
3665	10	15	....do	315	At pin.
3666	10	15	....do	300	1 foot from pin.
3667	10	15	....do	285	Do.
3668	10	12	....do	320	Do.
3669	10	15	....do	305	Do.
3670	10	15	....do	290	At middle.
3671	10	14	....do	310	1 foot from pin.
3672	10	14	....do	310	At pin.

No. 4 SHOT LINES—Continued.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds	*Ounces.*		*Pounds.*	
3673	10	14	Outside	295	At middle.
3674	10	14	....do	285	At pin.
3675	10	15	....do	295	6″ from pin.
3676	10	15	....do	310	At middle.
3677	10	15	....do	305	Do.
3678	10	15	....do	290	Do.
3679	10	14	.. do	285	1 foot from pin.
3680	10	13	....do	290	Do.
3681	10	14	....do	290	At pin.
3682	10	14	....do	285	1 foot from pin.
3683	10	13	....do	250	Do.
			... do	300	At middle.
3684	11	1	....do	325	Do.
3685	11	0	....do	330	Do.
3686	11	1	... do	305	At pin.
3687	11	2	....do	315	At middle.
3688	10	14	...do	300	6″ from pin.
3689	10	14	.. do	295	1 foot from pin.
3690	10	14	....do	290	6″ from pin.
3691	10	14	....do	290	At middle.
3692	10	13	.. do	315	Do.
3692	10	13	.. do	310	Do.
3694	11	1	....do	305	Do.
3695	10	14	....do	290	At pin.
3696	11	0	....do	300	At middle.
3697	10	14	....do	300	6″ from pin.
3698	10	15	....do	305	1 foot from pin.
3699	10	14	.. do	290	6″ from pin.
3700	10	15	...do	280	1 foot from pin.
3701	10	13	....do	320	At pin.
3702	10	14	....do	295	At middle.
3703	11	6	....do	310	Do.
3704	11	6	.. do	300	Do.
			....do	275	1 foot from pin.
3705	11	5	do	270	At middle.
			Inside	340	6″ from pin.
			Outside	330	Do.
3706	11	6	... do	315	Do.
3707	11	5	... do	305	1 foot from pin.
3708	11	7	.. do	305	6″ from pin.
3709	11	6	.. do	320	Do.
3710	11	5	... do	300	1 foot from pin.
3711	11	5	....do	330	Do.
3712	11	5	....do	290	At middle.
3713	11	5	....do	340	6″ from pin.
3714	11	5	.. do	295	Do.
3715	11	3	... do	330	1 foot from pin.
3716	11	5	.. do	535	At middle.
3717	11	5	.. do	285	1 foot from pin.
3718	11	6	....do	300	6″ from pin.
3719	11	2	... do	305	At middle.
3720	11	6	....do	300	6″ from pin.
3721	11	4	...do	305	1 foot from pin.
3722	11	2	... do	310	At pin.
3723	11	2	...do	310	At middle.
3724	11	2	.. do	300	6″ from pin.
3725	11	4	.. do	280	1 foot from pin.
3726	11	3	....do	290	At pin.
3727	11	3	....do	305	Do.
3728	11	2	....do	310	At middle.
3729	11	1	....do	305	Do.
3730	11	3	....do	280	1 foot from pin.
3731	11	4	....do	300	6″ from pin.
3732	11	4	....do	320	Do.
3733	11	4	....do	300	At middle.
3734	11	4	....do	305	6″ from pin.
3735	11	3	.. do	300	At middle.
3736	11	4	...do	310	1 foot from pin.
3737	11	1	... do	325	At middle.
3738	11	4	....do	315	1 foot from pin.
3739	11	3	....do	300	At middle.
3740	11	0	... do	305	Do.
3741	11	0	....do	295	6″ from pin.
3742	11	6	... do	260	Do.
			....do	280	Do.
3743	11	4	....do	335	At middle.
3744	11	2	Inside	300	1 foot from pin.
3745	11	4	....do	340	At middle.
3746	11	4	....do	320	6″ from pin.

No. 4 SHOT LINES—Continued.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3747	11	4	Inside	335	At middle.
3748	11	3	do	300	1 foot from pin.
3749	11	2	do	330	At middle.
3750	11	3	do	310	1 foot from pin.
3751	11	1	do	305	Do.
3752	11	4	do	330	Do.
4039	11	4	Outside	305	Do.
4040	11	4	do	312	At pin.
4041	11	5	do	195	1 foot from pin.
			do	264	
			do	328	
			Inside	312	
4042	11	4	Outside	346	At middle.
4043	11	5	do	332	1 foot from pin.
4044	11	7½	do	341	At middle.
4045	11	6	do	373	1½ feet from pin.
4046	11	7½	do	351	At middle.
4047	11	8½	do	338	At pin.
4048	11	8	do	342	Do.
4049	11	8	do	332	At middle.
4050	11	8	do	354	1 foot from pin.
4051	11	8	do	349	At middle.
4052	11	7	do	332	Do.
4053	11	8	do	347	1 foot from pin.
4054	11	8	do	352	At middle.
4055	11	8½	do	318	Do.
4056	11	7	do	326	1 foot from pin.
4057	11	5	do	370	At middle.
4058	11	6½	do	364	Do.
4059	11	6½	do	402	At pin.
4060	11	6	do	397	1 foot from pin.
4061	11	6	do	319	At pin.
4062	11	6½	do	388	Do.
4063	11	2	do	382	1 foot from pin.
4064	11	6	do	380	At middle.
4065	11	6	do	402	Do.
4066	11	10	do	374	At pin.
4067	11	6	do	350	Do.
4068	11	8	do	299	At middle.
4069	11	8	do	348	At pin.
4070	11	6	do	346	1 foot from pin.
4071	11	8	do	344	Do.
4072	11	8	do	376	At middle.
4073	11	5	do	351	Do.
4074	11	4	do	359	Do.
4075	11	4	do	336	1 foot from pin.
4076	11	5	do	348	Do.
4077	11	4	do	335	At middle.
4078	11	8	do	362	Do.
4079	11	6	do	336	Do.
4080	11	6	do	349	Do.
4081	11	6	do	330	1 foot from pin.
4082	11	7½	do	346	Do.
4083	11	7	Inside	345	At pin.
4084	11	6½	do	380	Do.
4085	11	7½	do	402	1 foot from pin.
4086	11	7½	do	378	Do.
4087	11	6½	do	340	At middle.
4088	11	7½	do	338	1 foot from pin.
4089	11	6½	do	344	At middle.
4090	11	7½	do	390	At pin.
4091	11	8	do	345	Do.
4092	11	5	do	360	At middle.
4093	11	8	do	389	1 foot from pin.
4094	11	6½	do	379	At middle.
4095	11	8	do	398	Do.
4096	11	7	do	359	At pin.
4097	11	4	do	329	1 foot from pin.
4098	11	8	do	361	At pin.
4099	11	7	do	310	At middle.
4100	11	6	do	390	At pin.
4101	11	6	do	315	At middle.
4102	11	3	do	368	1 foot from pin.
4103	11	4	do	308	At middle.
4104	11	4	do	332	6½ from pin.
4105	11	4	do	353	At middle.
4106	11	4	do	303	At pin.
4107	11	3½	do	308	At middle.
4108	11	5	do	298	At pin.

No. 4 SHOT LINES—Continued.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
4109	11	6	Inside	347	At middle.
4110	11	6	....do	386	1 foot from pin.
4111	11	6	....do	352	Do.
4112	11	3½	... do	363	At middle.
4113	11	4	... do	337	Do.
4114	11	5½	....do	332	1 foot from pin.
4115	11	6	....do	305	At pin.
4116	11	3½	....do	324	At middle.
4117	11	6	... do	350	At pin.
4118	11	6	....do	328	Do.
4119	11	6	....do	308	At middle.
4120	11	6	....do	298	Do.
4121	11	6	....do	359	1 foot from pin.
4122	11	7	... do	341	At middle.
4123	11	4	....do	289	Do.
4124	11	4	....do	345	Do.
4125	11	5	... do	328	Do.
4126	11	6	Outside	299	Do.
4127	11	4	....do	361	At pin.
4128	11	8	....do	278	1 foot from pin.
4129	11	6½	....do	274	Do.
4130	11	7	....do	349	At middle.
4131	11	3	....do	316	1 foot from pin.
4132	11	3	....do	320	At pin.
4133	11	5½	....do	297	1 foot from pin.
4134	11	3	....do	297	At middle.
4135	11	3	....do	328	At pin.
4136	11	4	... do	322	At middle.
4137	11	8	....do	350	At pin.
4138	11	4	....do	342	At middle.
			....do	356	At middle (Tested wet).

No. 7 Shot Lines.

Diameter of lines, ".2.
Lay, one turn in ".7.
Three strands of eight threads each.

No. of test.	Weight of coil		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3192	18	7	Outside	702	1 foot from pin.
3193	18	11	do	772	At pin.
3194	18	4	do	796	Do.
3195	18	12	do	790	Do.
3196	18	11	do	695	1 foot from pin.
3197	18	14	do	740	At pin.
3198	18	8	do	712	Do.
3199	18	6	do	736	Do.
3200	18	11	do	710	1 foot from pin.
3201	18	9	do	756	At pin.
3202	18	11	do	802	At middle.
3203	18	9	do	780	Do.
3204	18	8	do	418	At pin.
			do	810	
			Inside	734	
3205	18	8	Outside	705	At middle.
3206	18	8	do	694	At pin.
3207	18	12	do	758	At middle.
3208	18	12	do	760	1 foot from pin.
3209	18	12	do	750	At pin.
3210	18	12	do	695	1 foot from pin.
3211	18	8	do	790	At pin.
3212	18	9	do	789	1 foot from pin.
3213	18	11	do	755	At pin.
3214	18	9	do	588	6" from pin.
			do	705	
3215	18	9	do	792	At pin.
3216	18	8	do	672	6" from pin.
3217	13	9	do	698	1 foot from pin.
3218	18	10	do	768	At pin.
3219	18	9	do	730	10" from pin.
3220	18	8	do	796	At pin.
3221	18	10	do	770	1 foot from pin.
3222	18	10	do	678	At middle.
3223	18	9	do	720	At pin.
3224	18	11	do	680	Do.
3225	18	11	do	752	Do.
3226	18	11	do	710	1 foot from pin.
3227	18	9	do	730	At pin.
3228	18	9	do	775	Do.
3229	18	15	do	727	Do.
3230	18	9	do	758	1 foot from pin.
3231	18	10	do	770	15" from pin.
3232	18	11	do	788	At pin.
3233	18	10	do	830	3" from pin.
3234	18	9	do	704	At pin.
3235	18	8	do	708	Do.
3236	18	11	do	648	Do.
3237	18	9	do	698	6" from pin.
3238	18	12	do	768	At middle.
3239	18	7	do	687	At pin.
3240	18	8	Inside	705	Do.
3241	18	12	Outside	787	Do.
3242	18	10	do	738	Do.
3243	18	11	do	772	Do.
3244	18	9	do	712	8" from pin.
3245	18	12	do	726	At pin.
3246	18	9	do	758	6" from pin.
3247	18	12	do	737	At pin.
3248	18	6	do	740	1 foot from pin.
3249	18	11	do	789	At pin.
3250	18	12	do	785	3" from pin.
3251	18	8	do	799	At pin.
3252	18	8	do	792	Do.
3253	18	12	do	773	3" from pin.
3254	18	11	do	792	1 foot from pin.
3255	18	8	do	767	Do.
3256	18	11	do	752	8" from pin.
3257	18	9	do	712	At pin.
3258	18	9	Inside	705	8" from pin.
3259	18	11	do	745	6" from pin.
3260	18	10	Outside	648	1 foot from pin.
			do	800	
3261	18	10	Inside	662	At pin.

No. 7 SHOT LINES—Continued.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
			Inside	760	
3262	18	9	Outside	692	10″ from pin.
3263	18	10	...do	692	6″ from pin.
3264	18	8	Inside	720	At pin.
3265	18	14	....do	782	1 foot from pin.
3266	18	12	....do	778	At pin.
3267	18	8	....do	810	1 foot from pin.
3268	18	13	....do	791	At pin.
3269	18	6	....do	787	8″ from pin.
3270	18	8	....do	720	At pin.
3271	18	13	....do	772	1 foot from pin.
3272	18	8	....do	692	At pin.
3273	18	8	....do	748	Do.
3274	18	8	....do	576	Do.
			....do	780	
3275	18	5	....do	674	At pin.
3276	18	12	....do	815	At middle.
3277	18	9	....do	766	At pin.
3278	18	11	....do	704	At middle.
3279	18	9	....do	788	Do.
3280	18	10	....do	782	1 foot from pin.
3281	18	10	....do	805	At pin.
3282	18	7	....do	681	Do.
3283	18	8	....do	785	1 foot from pin.
3284	18	10	....do	785	10″ from pin.
3285	18	6	....do	691	8″ from pin.
3286	18	4	....do	759	6″ from pin.
3287	18	13	....do	648	1 foot from pin.
3288	18	9	....do	544	6″ from pin.
			....do	728	
3289	18	6	....do	725	8″ from pin.

ADDITIONAL TESTS OF NO. 7 SHOT LINES.

No. 3204.

Location of sample in coil.	Tensile strength.	Remarks.
	Pounds.	
200 feet from outside end	642	
400 feet from outside end	702	
900 feet from outside end	592	Parted at long splice which covered 39 inches length of line; 10″ from the end of the outside tuck.
1,100 feet from outside end	605	Parted at place where two threads were tied together; broke between the knots.
Near middle of coil	680	
Do	698	
600 feet from inside end	685	
400 feet from inside end	702	
200 feet from inside end	668	

No. 3288.

Total length of line, about 1,800 feet.

Location of sample in coil.	Tensile strength.	Remarks.
	Pounds.	
Outside end	540	
20 feet from outside end	715	
200 feet from outside end	690	
400 feet from outside end	720	
600 feet from outside end	758	
800 feet from outside end	710	
900 feet from outside end	576	Parted in long splice at middle tuck.
1,000 feet from outside end	69	
1,100 feet from outside end	746	Parted 8″ from a knot where several threads were tied together.
1,200 feet from outside end	770	
1,400 feet from outside end	762	
1,600 feet from outside end	735	

ELONGATION UNDER STRESS.

No. 3286.

Sample from outside end of coil.
Gauged length, 6 feet.

Applied loads.	In gauged length.		Remarks.
	Elongation.	Successive elongation.	
Pounds.	*Inches.*	*Inches.*	
50	2.50	2.50	
100	3.50	1.00	
150	4.50	1.00	
200	4.90	.40	
250	5.20	.30	
300	5.60	.40	
350	5.80	.20	
400	6.10	.30	
450	6.20	.10	
500	6.30	.10	
550	6.50	.20	
600	6.75	.25	
650	6.85	.10	
700	7.00	.15	
704	.....	.....	Tensile strength.

Parted at the pin.

No. 7.—SHOT LINES.

Waterproofed by means of a coating of paraffine.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3290	20	7	Outside.....	710	At pin.
3291	21	5	....do	715	At knot beyond pin.

No. 3291.

ELONGATIONS UNDER STRESS.

Second sample from outside end of coil.
Gauged length, 6 feet.

Applied loads.	In gauged length.		Remarks.
	Elongation.	Successive elongation.	
Pounds.	*Inches.*	*Inches.*	
50	1.00	1.00	
100	1.70	.70	
150	2.20	.50	
200	2.50	.30	
250	2.80	.30	
300	3.20	.40	
350	3.25	.05	
400	3.35	.10	
450	3.60	.25	
500	3.75	.15	
550	3.98	.23	
600	4.10	.12	
650	4.25	.13	
662	.....	.....	Tensile strength.

Parted 6″ from the pin.

No. 7 Shot Lines.

Second lot.

Diameter of lines, ".20.
Lay, one turn in ".70.
Three strands of eight threads each.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3888	20	1½	Outside	712	At pin.
3889	20	1	....do	738	Do.
3890	20	2	....do	708	1 foot from pin.
3891	20	8	....do	772	At middle.
3892	20	1	....do	752	At pin.
3893	20	6	....do	748	At middle.
3894	20	7	....do	754	Do.
3895	20	7⅛	....do	742	Do.
3896	20	7	....do	722	Do.
3897	20	6	....do	760	Do.
3898	20	7	....do	687	Do.
3899	20	9½	....do	789	Do.
3900	20	11	....do	794	Do.
3901	20	6	....do	656	At pin.
3902	20	6	....do	757	1 foot from pin.
3903	19	14	....do	710	At pin.
3904	19	14	....do	739	Do.
3905	19	14	....do	685	Do.
3906	19	15½	....do	724	Do.
3907	20	1	....do	752	Do.
3908	20	1	....do	755	At middle.
3909	20	1	....do	748	1 foot from pin.
3910	20	2⅛	....do	788	Do.
3911	20	2	....do	754	6" from pin.
3912	20	1	....do	715	At middle.
3913	20	8½	....do	760	Do.
3914	20	1⅛	....do	713	At pin.
3915	20	2	....do	790	Do.
3916	20	5½	....do	788	At middle.
3917	20	7½	....do	802	Do.
3918	20	6	....do	755	1 foot from pin.
3919	20	7⅛	....do	775	At pin.
3920	20	5½	....do	797	Do.
3921	20	5½	....do	745	At middle.
3922	20	6	....do	784	At pin.
3923	20	6½	....do	691	Do.
3924	20	2	....do	752	Do.
3925	20	7½	....do	810	1 foot from pin.
3526	20	10½	....do	815	At pin.
3927	20	13	....do	810	Do.
3928	20	7½	....do	793	1 foot from pin.
3929	20	4½	....do	800	At middle.
3930	20	4½	....do	770	Do.
3931	20	7½	....do	580	At pin.
			....do	660	At middle.
3933	20	1	....do	694	At pin.
3934	20	1⅛	....do	705	At middle.
3935	20	2	....do	790	At pin.
3936	20	2	....do	688	Do.
3937	20	3½	....do	708	1 foot from pin.
3938	20	2	....do	756	At middle.
3939	20	4	....do	797	1 foot from pin.
3940	20	2½	....do	712	Do.
3941	20	7⅛	....do	794	At pin.
3942	20	1⅛	....do	749	At middle.
3943	20	10½	....do	777	Do.
3944	20	9	....do	830	At pin.
3945	20	8	....do	797	Do.
3946	20	5	....do	808	1 foot from pin.
3947	20	5½	....do	835	At pin.
3948	20	4	....do	790	At middle.
3949	20	4½	....do	778	At pin.
3950	20	12⅛	....do	835	Do.
3951	20	11	....do	799	At middle.
3952	20	8	....do	802	Do.
3953	20	2	....do	797	1 foot from pin.
3954	20	0	....do	704	At pin.
3955	20	12½	....do	788	Do.
3956	20	3	....do	768	At middle.
3957	20	6	....do	774	At pin.
3958	20	6½	....do	706	Do.

No. 7 SHOT LINES—Continued.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3959	20	6½	Outside	753	At pin.
3960	20	8	....do	762	At middle.
3961	20	8	....do	703	At pin.
3962	20	8½	....do	702	Do.
3963	20	8	....do	794	At middle.
3964	20	11	....do	800	At pin.
3965	20	9	....do	795	Do.
3966	20	10½	....do	820	Do.
3967	20	8	....do	720	Do.
3968	20	9½	....do	834	Do.
3969	20	0	....do	745	1 foot from pin.
3970	20	4	....do	835	At middle.
3971	20	8	....do	749	Do.
3972	19	15½	....do	747	At pin.
3973	20	6	....do	789	Do.
3974	20	1	....do	748	Do.
3975	20	14	....do	805	At middle.
3976	20	11	....do	798	At pin.
3977	20	6	....do	799	Do.
3978	20	12½	Inside	870	At middle.
3979	20	10½	....do	830	1 foot from pin.
3980	20	11	....do	895	At middle.
3981	20	10	....do	744	At pin.
3982	20	11½	....do	838	At middle.
3983	20	1	....do	746	At pin.
3984	20	½	....do	750	Do.
3985	20	2	....do	791	At middle.
3986	20	2	....do	796	At pin.
3987	20	11	....do	815	At middle.
3988	20	10	....do	784	At pin.
3989	20	10½	....do	810	1 foot from pin.
3990	20	12	....do	806	At pin.
3991	20	8	....do	718	Do.
3992	20	½	....do	755	At middle.
3993	20	3	....do	714	At pin.
3994	20	4	....do	742	Do.
3995	20	3	....do	750	At middle.
3996	20	8	....do	764	Do.
3997	20	10	....do	793	At pin.
3998	20	14	....do	855	Do.
3999	20	5½	....do	758	At middle.
4000	20	10	....do	810	At pin.
4001	19	14	....do	702	1 foot from pin.
4002	20	5	....do	798	At middle.
4003	20	8	....do	805	1 foot from pin.
4004	20	11	....do	802	At pin.
4005	20	9	....do	800	Do.
4006	20	0	....do	705	Do.
4007	20	4	....do	786	Do.
4008	20	8	....do	804	Do.
4009	20	4½	....do	806	Do.
4010	20	4	....do	810	At middle.
4011	20	4	....do	778	Do.
4012	20	4	....do	812	At pin.
4013	20	1	....do	768	Do.
4014	19	13	....do	812	Do.
4015	20	7	....do	796	Do.
4016	20	0	....do	795	Do.
4017	20	½	....do	742	At middle.
4018	20	9½	....do	815	At pin.
4019	20	5	....do	808	Do.
4020	19	14	....do	800	1 foot from pin.
4021	20	7	....do	830	At pin.
4022	20	1	....do	789	1 foot from pin.
4023	30	5½	....do	747	Do.
4024	20	7	....do	812	At middle.
4025	20	7	....do	845	1 foot from pin.
4026	19	14½	....do	685	At pin.
4027	20	5	....do	740	At middle.
4028	20	7	....do	812	Do.
4029	20	4	....do	715	Do.
4030	20	5½	....do	722	1 foot from pin.
4031	20	1½	Outside	747	Do.
4032	20	2½	....do	697	At pin.
4033	20	5	....do	702	Do.
4034	20	4	....do	712	Do.
4035	20	0	....do	763	Do.
4036	20	1½	....do	699	1 foot from pin.
4037	20	1½	....do	735	At pin.
4038	20	1	....do	705	Do.

No. 9 Shot Lines.

Diameter of lines, ".28.
Lay, one turn in ".9.
Three strands of sixteen threads each.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3398	37	8	Inside	1,445	1 foot from pin.
3399	37	8	....do	1,195	Do.
3400	37	8	....do	1,484	At middle.
3401	37	8	....do	1,386	At pin.
3402	37	4	....do	1,246	1 foot from pin.
3403	37	4	....do	1,353	At pin.
3404	37	4	....do	1,192	Do.
3405	38	0	....do	1,535	Do.
3406	37	4	....do	1,205	Do.
3407	37	12	....do	1,200	Do.
3408	37	8	....do	1,250	Do.
3409	37	4	....do	1,110	Do.
3410	37	8	....do	1,250	6" from pin.
3411	36	8	....do	1,145	1 foot from pin.
3412	36	8	....do	1,150	At middle.
3413	36	12	....do	1,160	At pin.
3414	37	12	....do	1,130	Do.
3415	37	0	....do	1,135	2 feet from pin.
3416	37	12	....do	1,360	At pin.
3417	37	8	....do	1,230	Do.
3418	37	8	....do	1,170	At middle.
3419	37	8	....do	1,280	Do.
3420	37	12	....do	1,395	Do.
3421	36	8	....do	1,210	At pin.
3422	36	8	....do	1,090	Do.
3423	37	0	Outside	1,100	Do.
3424	37	4	....do	1,135	Do.
3425	37	4	....do	1,055	Do.
3426	36	8	....do	1,035	At middle.
3427	37	12	....do	1,210	1 foot from pin.
3428	38	0	....do	1,150	At pin.
3429	37	8	....do	1,145	Do.
3430	37	8	....do	1,175	1 foot from pin.
3431	38	0	....do	1,170	Do.
3432	37	8	....do	1,110	At pin.
3433	37	12	....do	1,050	6" from pin.
3434	37	0	....do	1,185	At middle.
3435	37	0	....do	1,150	1 foot from pin.
3436	37	4	....do	1,065	At middle.
3437	37	12	....do	1,185	At pin.
3438	37	8	....do	1,130	At middle.
3439	36	8	....do	1,010	2 feet from pin.
3440	37	12	....do	1,190	At pin.
3441	37	12	....do	1,250	6" from pin.
3442	37	12	....do	1,155	At pin.
3443	36	4	....do	1,050	6" from pin.
3444	37	8	....do	1,090	Do.
3445	37	4	....do	1,090	At pin.
3446	37	4	....do	1,120	Do.
3447	37	12	....do	1,115	Do.
3448	37	4	....do	1,020	Do.
3449	36	8	....do	1,275	Do.
3450	37	8	....do	1,065	Do.
3451	37	12	....do	1,205	Do.
3452	38	0	....do	1,225	Do.
3453	37	12	....do	1,145	Do.
3454	37	4	....do	1,140	Do.
3455	37	4	....do	1,130	Do.
3456	37	4	....do	1,295	1 foot from pin.
3457	36	12	....do	1,110	6" from pin.
3458	37	0	....do	1,200	At pin.
3459	37	0	....do	1,130	1 foot from pin.
3460	37	8	....do	1,150	6" from pin.
3461	37	8	....do	1,110	At pin.
3462	37	4	....do	1,015	Do.
3463	38	0	....do	1,175	Do.
3464	36	12	....do	1,180	Do.
3465	37	12	....do	1,225	1 foot from pin.
3466	38	0	....do	1,350	At pin.
3467	36	12	....do	1,095	Do.
3468	37	4	....do	1,205	Do.
3469	36	12	....do	1,160	3" from pin.

No. 9 SHOT LINES—Continued.

No. of test.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
3470	37	8	Outside	1,130	At pin.
3471	37	8	....do	1,265	Do.
3472	37	0	... do	1,050	Do.
3473	37	12	... do	1,200	Do.
3474	37	8	... do	1,125	1 foot from pin.
3475	37	4	... do	1,150	At pin.
3476	36	12	... do	1,180	Do.
3477	36	12	.. do	1,130	Do.
3478	36	12	....do	1,150	Do.
3479	36	8	....do	1,050	Do.
3480	36	8	....do	980	1 foot from pin.
			Inside	1,319	
3481	37	8	Outside	1,120	At pin.
3482	37	8	.. do	1,190	Do.
3483	37	8	....do	1,205	At middle.
3484	37	0	....do	1,140	At pin.
3485	37	8	....do	1,080	Do.
3486	37	8	....do	1,170	Do.
3487	37	8	....do	1,180	Do.
3488	37	8	....do	1,175	Do.
3489	37	0	....do	990	1 foot from pin.
			Inside	1,156	
3490	37	12	Outside	1,110	At middle.
3491	37	0	... do	1,220	At pin.
3492	36	12	....do	1,070	Do.
3493	37	8	....do	1,115	6" from pin.
3494	37	4	....do	1,230	At pin.
3495	37	8	Inside	1,370	1 foot from pin.
3496	37	8	....do	1,410	At middle.
3497	38	0	....do	1,275	At pin.
3498	37	12	... do	1,295	At middle.
3499	36	8	....do	1,200	1 foot from pin.
3500	37	4	....do	1,275	At pin.
3501	36	8	....do	1,180	Do.
3502	36	12	....do	1,225	1 foot from pin.
3503	37	4	....do	1,195	At middle.
3504	37	8	....do	1,140	1 foot from pin.
3505	36	12	... do	1,130	At pin.
3506	37	0	....do	1,290	At middle.
3507	37	8	....do	1,420	At pin.
3508	37	4	....do	1,200	1 foot from pin.
3509	37	8	....do	1,350	At pin.
3510	37	12	... do	1,250	1 foot from pin.
3511	36	12	....do	1,375	At pin.
3512	37	8	....do	1,165	1 foot from pin.
3513	36	12	....do	1,235	At pin.
3514	38	0	....do	1,340	1 foot from pin.
3515	36	12	.. do	1,305	Do.
3516	36	12	....do	1,160	At pin.
3517	38	4	Outside	1,180	Do.
3518	38	0	.. do	1,110	Do.
3519	37	4	... do	1,040	1 foot from pin.
3520	37	12	....do	1,250	6" from pin.
3521	36	12	....do	1,140	At pin.
3522	37	8	....do	1,170	Do.
3523	37	4	....do	1,150	Do.
3524	36	12	....do	1,060	Do.
3525	37	4	....do	1,140	6" from pin.
3526	36	12	....do	1,125	1 foot from pin.
3527	36	12	....do	980	Do.
			Inside	1,320	
3528	36	12	Outside	1,150	At middle.
3529	36	12	....do	1,152	At pin.
3530	36	8	... do	1,240	Do.
3531	37	4	....do	1,180	Do.
3532	36	12	....do	1,195	Do.
3533	37	8	....do	1,145	Do.
3534	38	0	....do	1,180	Do.
3535	38	0	....do	1,150	Do.
3536	37	12	....do	1,070	Do.
3537	37	0	....do	1,200	Do.
3538	37	8	....do	1,145	Do.
3539	36	12	....do	1,165	Do.
3540	37	8	....do	1,140	Do.
3541	36	12	....do	1,090	1 foot from pin.
3542	37	0	....do	1,215	Do.
3543	36	12	....do	1,085	At pin.
3544	36	12	... do	1,265	1 foot from pin.
3545	36	12	....do	1,190	At pin.
3546	36	8	....do	1,195	Do.
3547	37	0	....do	1,175	Do.

No. 9 Shot Lines.

Second lot.

Diameter of lines, ".29.
Lay, one turn in ".95.
Three strands of sixteen threads each.

No. of test.	Weight of coil		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
4139	38	4	Outside	1,230	At pin.
4140	37	12	do	980	1 foot from pin.
4141	38	0	do	1,182	At pin.
4142	38	0	do	1,385	Do.
4143	38	0	do	1,295	Do.
4144	38	0	do	1,268	1 foot from pin.
4145	38	0	do	1,198	At pin.
4146	38	4	do	1,210	Do.
4147	37	8	do	1,240	Do.
4148	38	4	do	1,289	Do.
4149	38	4	do	1,397	Do.
4150	38	0	do	1,040	Do.
4151	38	0	do	1,277	Do.
4152	38	4	do	1,360	Do.
4153	38	0	do	1,325	Do.
4154	38	0	do	1,289	Do.
4155	38	4	do	1,232	Do.
4156	39	0	do	1,249	Do.
4157	38	4	do	1,167	Do.
4158	38	0	do	1,375	Do.
4159	38	8	do	1,308	Do.
4160	38	4	do	1,385	Do.
4161	38	4	do	1,377	Do.
4162	38	4	do	1,240	Do.
4163	38	0	do	1,247	Do.
4164	38	4	do	1,185	At middle.
4165	38	0	do	1,303	Do.
4166	38	0	do	1,305	At pin.
4167	38	4	do	1,186	At middle.
4168	38	8	do	1,248	At pin.
4169	38	8	do	1,255	Do.
4170	38	8	do	1,326	Do.
4171	38	12	do	1,138	Do.
4172	38	12	do	1,110	Do.
4173	38	8	do	1,278	Do.
4174	38	12	do	1,379	Do.
4175	38	8	do	1,344	Do.
4176	38	0	do	1,125	Do.
4177	38	0	do	1,110	Do.
4178	38	0	do	1,255	Do.
4179	38	2	do	1,265	Do.
4180	38	4	do	1,238	Do.
4181	38	4	do	1,264	Do.
4182	38	4	do	1,275	Do.
4183	38	12	do	1,270	Do.
4184	38	8	do	1,085	At middle.
4185	37	14	do	1,190	Do.
4186	38	2	do	1,120	At pin.
4187	38	4	do	1,168	Do.
4188	38	4	do	1,172	Do.
4189	38	6	do	1,183	Do.
4190	38	4	do	1,230	Do.
4191	38	12	do	1,394	Do.
4192	38	8	do	1,400	Do.
4193	38	10	do	1,205	Do.
4194	38	8	do	1,252	Do.
4195	38	10	do	1,085	1 foot from pin.
4196	37	10	do	1,157	At pin.
4197	38	2	do	1,258	At middle.
4198	38	4	do	1,267	1 foot from pin.
4199	38	8	do	1,346	At pin.
4200	38	0	do	1,172	Do.
4201	38	0	do	1,332	Do.
4202	38	2	do	1,205	Do.
4203	38	8	Inside	1,210	Do.
4204	37	14	do	1,290	Do.
4205	38	8	do	1,260	Do.
4206	38	4	do	1,278	Do.
4207	38	4	do	985	Do.
			do	1,248	Do.

No. 9 Shot Lines—Continued.

of t.	Weight of coil.		End of coil tested.	Tensile strength.	Fractured.
	Pounds.	*Ounces.*		*Pounds.*	
8	37	14	Inside	1,274	At pin.
9	38	8	do	1,200	Do.
0	38	8	do	1,247	Do.
1	38	0	do	1,045	Do.
2	37	12	do	1,193	Do.
3	38	0	do	1,205	Do.
4	38	10	do	1,170	Do.
5	38	2	do	1,167	Do.
6	38	2	do	1,060	Do.
7	38	12	do	1,198	Do.
8	38	12	do	1,195	Do.
9	37	14	do	1,177	Do.
0	37	12	do	1,110	Do.
1	38	12	do	1,202	Do.
2	38	0	do	1,288	Do.
3	38	0	do	1,149	At middle.
4	38	2	do	1,282	At pin.
5	38	8	do	1,184	At middle.
6	37	14	do	1,247	At pin.
7	38	0	do	1,015	Do.
8	38	2	do	1,070	Do.
9	38	10	do	1,132	1 foot from pin.
0	38	12	do	980	At middle.
			do	1,384	
1	38	10	do	870	1 foot from pin.
			do	1,215	
2	37	14	do	1,167	At middle.
3	37	12	do	1,047	At pin.
4	37	14	do	1,174	Do.
5	38	10	do	1,168	Do.
6	37	12	do	1,005	Do.
7	38	6	do	1,125	Do.
8	38	0	do	1,090	Do.

PRIVATE TESTS.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1889.				
July 6	Adhesion of nails	Perkins Brothers	Bridgwater	Mass.
8	Cast-iron	Whittier Machine Co	South Boston	Mass.
10	Pressure gauges	Boston Heating Co	Boston	Mass.
12	Steel and wrought-iron plates.	Atlantic Works	East Boston	Mass.
16	Bricks	H. W. Ball	Boston	Mass.
	Wrought-iron bolt	Norcross Brothers	....do	Mass.
17	Steel plate	F. A. Houdlette & Co	....do	Mass.
18	Belting	S. Budlong & Co	Providence	R. I.
	Steel plate and bars	Rhode Island Locomotive Works.	....do	R. I.
	....do	New York Locomotive Works.	Rome	N. Y.
18	Steel plate	I. P. Morris Co	Philadelphia	Pa.
25	Cotton ducking	J. H. Lane & Co	Boston	Mass.
26	Steel plate	Wm. Allen & Sons	Worcester	Mass.
30	Leather belting	S. Budlong & Co	Providence	R. I.
31	Railroad draw-bar	Mitis Wrought-Iron Casting Co.	Neponset	Mass.
Aug. 3	Helical car spring	John Kent	Boston	Mass.
9	Spirally wound tube	Pneumatic Dynamite Gun Co.	New York	N. Y.
12	Plain and electrically welded wire cable.	Thomson Electric Welding Co.	Lynn	Mass.
	Composition metal	George F. Blake Manufacturing Co.	Boston	Mass.
20	Chain cable	Bradlee & Co	Philadelphia	Pa.
	Wrought-iron plate	Boston Bridge Works	Boston	Mass.
21	Bricks	Norcross Brothers	....do	Mass.
	Rolled iron bar	A. V. Abbott	....do	Mass.
22	Bricks	H. W. Ball	....do	Mass.
31	Riveted chain	Mitis Wrought-Iron Casting Co.	Neponset	Mass.
Sept. 2	Steel plate	Whittier Machine Co	Roxbury	Mass.
	....do	I. P. Morris Co	Philadelphia	Pa.
2	....do	George H. Lloyd	Boston	Mass.
	Steel plates and bars	Prof. J. E. Denton	Hoboken	N. J.
3	Wrought-iron bars	B. M. Jones & Co	Boston	Mass.
12	Steel wire cable	Thomson Electric Welding Co.	....do	Mass.
14	Wrought-iron plate	Boston Bridge Works	....do	Mass.
	Steel wire strand	Gen. E. W. Serrell	New York	N. Y.
21	Steel wire cable	Thomson Electric Welding Co.	Boston	Mass.
26	Mitis iron	Mitis Wrought-Iron Casting Co.	Neponset	Mass.
Oct. 1	Chain cable	Bradlee & Co	Philadelphia	Pa.
18	Plate iron	Boston Bridge Works	Boston	Mass.
19	Chain iron	Bradlee & Co	Philadelphia	Pa.
21	Steel plates	E. D. Leavitt	Cambridgeport	Mass.
	Cast-iron	R. H. Libby	Boston	Mass.
	Wrought-iron bars	Portland Rolling Mill	Portland	Me.
22	Steel plate	New York and New England Railroad.	Boston	Mass.
29	Stone cube	Peabody & Stearns	....do	Mass.
31	Brass	Aluminum Brass and Bronze Co.	Bridgeport	Conn.
Nov. 1	Building material	C. T. Corning & Co	St. Paul	Minn.
4	Cast-iron	John F. Souther	Boston	Mass.
12	Bronze bars	Aluminum Brass and Bronze Co.	Bridgeport	Conn.
	Cast-iron	R. H. Libby	Boston	Mass.
15	Cable chains	Thomas Morton	New York	N. Y.
	Perforated plates	Pratt & Whitney Co	Hartford	Conn.
17	Wrought-iron bolts	H. W. Ball	Boston	Mass.
19	Granite	Berlin Granite Co	Montpelier	Vt.
26	Chain cable	Bradlee & Co	Philadelphia	Pa.
29	Bricks	H. W. Ball	Boston	Mass.
30	....do	David Smith	Newburyport	Mass.
Dec. 2	Chain cable	P. Hayden Saddlery Hardware Co.	Columbus	Ohio.
4	Bricks	C. U. Cotting	Boston	Mass.
5	Cast-iron	J. F. Souther	....do	Mass.
11	Sash chain	Thomas Morton	New York	N. Y.
12	Yellow metal bars	George F. Blake Manufacturing Co.	Boston	Mass.
12	Spirally wound tube	Pneumatic Dynamite Gun Co.	New York	N. Y.

PRIVATE TESTS—Continued.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1889.				
Dec. 18	Cast steel	I. P. Morris Co	Philadelphia	Pa.
	Steel plate	Stone, Carpenter & Willson	Providence	R. I.
19	Cast steel	American Steel Car Wheel Co.	Boston	Mass.
24	Perforated plates	Pratt & Whitney Co	Hartford	Conn.
1890.				
Jan. 2	Steel bars	Standard Steel Co	Boston	Mass.
6	Chain cable	Baker Chain and Wagon Iron Manufacturing Co.	Allegheny	Pa.
7	Bricks	Norcross Brothers	Boston	Mass.
	Sandstone	do	do	Mass.
	Marble	do	do	Mass.
16	Bricks	do	do	Mass.
	Bronze	Aluminum Brass and Bronze Co.	Bridgeport	Conn.
	Plate iron	G. W. & F. Smith Iron Co	Boston	Mass.
	Steel and iron castings	Golding & Co	do	Mass.
17	Copper bars	C. H. Gay	do	Mass.
	Bronze	Aluminum Brass and Bronze Co.	Bridgeport	Conn.
18	Wrought-iron rods	Prof. G. Lanza	Boston	Mass.
20	Rail joints	McConway Torley Co	New York	N. Y.
21	Steel bars	American Steel Car Wheel Co.	Boston	Mass.
	Granite	Rock Hill Granite Co	Bethlehem	Pa.
22	Swivels	Baker Chain and Wagon Iron Manufacturing Co.	Allegheny	Pa.
	Wrought-iron rods	Prof. G. Lanza	Boston	Mass.
23	Steel bars	Standard Steel Co	do	Mass.
24	Wrought-iron bar	Boston Bridge Works	do	Mass.
Feb. 1	Marble	H. W. Ball	do	Mass.
3	Bronze	Cowles, E. S. & Al. Co	Lockport	N. Y.
4	do	Aluminum Brass and Bronze Co.	Bridgeport	Conn.
	Chain cable	Baker Chain and Wagon Iron Manufacturing Co.	Allegheny	Pa.
	Iron	Mitis Wrought-Iron Casting Co.	Neponset	Mass.
	Steel plate	C. C. Loring	Boston	Mass.
	Marble	Sheldon Marble Co	West Rutland	Vt.
5	Bricks	Fiske, Coleman & Co	Boston	Mass.
7	Steel plate	Nashua Iron and Steel Co	do	Mass.
12	Paper	Philips and Kunhardt	Lawrence	Mass.
13	Oölitic limestone	Franz R. Caden & Co	Evansville	Ind.
	Stone	W. W. Hazlett	Walker's Mills	Pa.
	Bricks	Norcross Brothers	Boston	Mass.
	Bronze	Cowles, E. S. & Al. Co	Lockport	N. Y.
15	Zinc buttons	A. J. Tower	Roxbury	Mass.
17	Steel plate	New York and New England Railroad.	Norwood	Mass.
	Wrought-iron	Boston Bridge Works	Boston	Mass.
19	Copper wire	A. A. Brocks	do	Mass.
	Welded brass and iron pipes.	Thomson Electric Welding Co.	do	Mass.
26	Bricks	Frank B. Gilbreth	do	Mass.
Mar. 3	do	Fiske Coleman & Co	do	Mass.
4	Stones	M. A. Sweeney & Bro	Jeffersonville	Ind.
	Swivel	Baker Chain and Wagon Iron Manufacturing Co.	Allegheny	Pa.
	Steel hangers	Northern Pacific Railroad Co.	St. Paul	Minn.
5	Steel plate	E. D. Leavitt	Cambridgeport	Mass.
8	Bricks	C. H. Barbour, agt	St. Paul	Minn.
	Bricks	Somerset Potters' Works	Somerset	Mass.
11	Marble	W. K. Sheldon	West Rutland	Vt.
12	Steel plate	Geo. H. Lloyd	Boston	Mass.
	Steel plate	Hartford Steam Boiler Inspection and Insurance Co.	do	Mass.
13	Buttons	A. J. Tower	Roxbury	Mass.
	Cement cube	H. O. Burch	New London	Conn.
14	Cast iron	G. W. & F. Smith Iron Co	Boston	Mass.
	Bronze	Cowles E. S. & Al. Co	Lockport	N. Y.
19	Chain cable	Baker Chain and Wagon Iron Manufacturing Co.	Allegheny	Pa.
21	Carbonized stone	H. O. Burch	New London	Conn.
	Face bricks	St. Joseph Pressed Brick Co.	St. Joseph	Mo.

PRIVATE TESTS—Continued.

Date.	Material.	For whom tested.		
		Name.	City.	State.
	Stones	Chattanooga Marble and Stone Co.	Chattanooga	Tenn.
	Bronze	Cowles E. S. & Al. Co	Lockport	N. Y.
April 2	Wrought iron	Boston Bridge Works	Boston	Mass.
	Steel plate	Chas. C. Loring	do	Mass.
	Cast iron	Golding & Co	do	Mass.
	Steel hangers	Northern Pacific Railroad Co.	St. Paul	Minn.
11	Riveted joint	I. P. Morris Co	Philadelphia	Pa.
	Steel plate	do	do	Pa.
	Chain cable	Baker Chain and Wagon-Iron Manufacturing Co.	Allegheny	Pa.
12	Steel wire	Chas. W. Bassett	Newton	Mass.
	Copper wire	Prof. W. L. Hooper	College Hill	Mass.
16	Granite	Yale and Towne Manufacturing Co.	Stamford	Conn.
	Marble	S. M. Folsom	Albuquerque	N. Mex.
	Bluestone	Warsaw Bluestone Co	Warsaw	N. Y.
	Steel plate	Chas. C. Loring	Boston	Mass.
23	Copper wire	American Circular Loom Co.	do	Mass.
24	Steel plates	Geo. H. Lloyd	do	Mass.
	Steel castings	American Steel Car Wheel Co.	do	Mass.
25	Wire chain	Bridgeport Chain Co	Bridgeport	Conn.
	Steel rails	P. H. Dudley	New York	N. Y.
	Chain cable	Jas. H. Baker	Allegheny	Pa.
28	Chain iron	do	do	Pa.
29	Riveted joints	I. P. Morris Co	Philadelphia	Pa.
	Steel plate	do	do	Pa.
	Steel plate	Chas. C. Loring	Boston	Mass.
May 3	Steel plate	Geo. H. Floyd	do	Mass.
5	Copper wire	American Circular Loom Co.	do	Mass.
	Bricks	Boston Terra Cotta Co	do	Mass.
	Steel bars	Thomson-Houston Electric Co.	Lynn	Mass.
	Wrought iron	Baker Chain and Wagon-Iron Manufacturing Co.	Allegheny	Pa.
13	Granite	John H. Rice	New York	N. Y.
14	Steel plates	Geo. H. Lloyd	Boston	Mass.
	Steel bar	Boston Bridge Works	do	Mass.
15	Wrought-iron bars	Prof. G. Lanza	do	Mass.
19	Granite	Norcross Brothers	do	Mass.
20	Wrought-iron bars	Thomson Electric Welding Co.	Lynn	Mass.
26	Cast-iron	Nashua Iron and Brass Foundry Co.	Nashua	N. H.
27	Chain cable	Baker Chain and Wagon-Iron Manufacturing Co.	Allegheny	Pa.
28	Wrought-iron bar	P. Hayden Saddlery Hardware Co.	Columbus	Ohio.
	Steel-wire rope	E. D. Leavitt	Cambridgeport	Mass.
29	Steel bars	Carnegie, Phipps & Co	Munhall	Pa.
June 6	Sandstone	The Detroit and Hocking Valley Red and Brown Stone Co.	Detroit	Mich.
7	Eye-bar	Lehigh Valley Railroad Co	Mauch Chunk	Pa.
11	Rail joint	Standard Railway Rail-joint Co	Boston	Mass.
	Steel plate	F. A. Houdlette & Co	do	Mass.
12	Bronze	Cowles E. S. and Al. Co	Lockport	N. Y.
28	Steel plate	Chas. C. Loring	Boston	Mass.
	do	Wm. Allen & Sons	Worcester	Mass.

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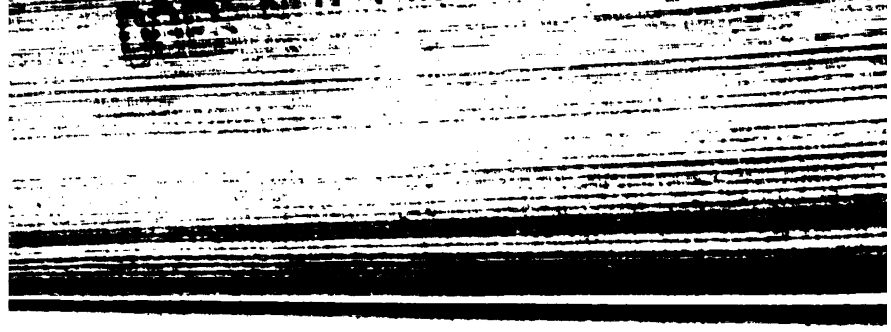
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